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Report on the Irrigation of the Ghugar [illegible]

15488

[This report is [illegible] in the reprint of [illegible] of the [illegible] administration [illegible] old Series [illegible] 1874]

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1874

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No. XXIV.

# REPORT ON THE IRRIGATION OF THE GUGUR AND THE SURSOOTEE.

*From* CAPTAIN J. D. CUNNINGHAM,

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*To Lieut.-Col.* J. T. BOILEAU, *Supdg. Engr.,*,

*N. W. Provinces, Umbala.*

*Dated, Simla, 25th July,* 1850.

SIR,—On the receipt of your letter of the 7th February last, conveying your instructions regarding an examination of the Dams of the Gugur and Sursootee, as ordered by Government, I made the necessary arrangements for going down the former and up the latter stream, measuring and delineating where necessary : and having completed the inspection of the Gugur, from near Pinjor to Moonuk on the Hureeana border, and of the Sursootee, from its mouth to Ladwa, I now proceed to lay before you the results of my observations. I may add that I have read a number of English letters, and gone through a number of Persian files of cases of disputed rights to irrigation from these rivers, received chiefly from the Office of the Commissioner and Superintendent of the Cis-Sutlej States, and that I have had the advantage of the free use of the manuscript Maps of the Revenue Survey, still in progress in the same districts under the direction of Captain Stephen. In former years I had opportunities of, personally, observing the character of the Gugur in Beekaneer and Bhuteeana. I have also been in

correspondence with the Collector at Hisar, and the Superintendent at Sirsa, and I have further received from your Office copies of different reports on the Gugur within the limits of these latter named districts. I was desirous of continuing the examination of the Sursootee to its source at the base of the outtermost hills, but a sickness, from which I have not yet recovered, obliged me to forego my purpose, and to leave my work rather wanting in some illustrative details, than in aught essential to its efficiency, I had also hoped to have been able to have inspected the Dams of the Markunda, and one or two other rivers, which Colonel Mackeson, indeed, seems to have regarded as advisable in his letter to the Board of Administration at Lahor, dated the 30th October last, and which I could have done with great advantage to the present enquiry, but a complete prostration of strength rendered the undertaking impossible during the height of the hot season. In conclusion, I may remark that the report which follows is divided into sections, a method which involves some repetition, but which has the advantage of rendering each subject complete in itself.

### *I.—On the channels or beds of the Gugur and Sursootee.*

2.—The Gugur drains one of those small outer ravines of the Himalayas, which are characterized by running parallel to the great mountain chain* until they open into the valleys of the larger Rivers, or sometimes, as in the case of the Gugur, until they burst a barrier and reach the plains independently. The Gugur has a westerly course within the hills of about twenty-five miles, when, on being joined by the Pinjor stream, it bends southerly and quits the mountains altogether. It preserves a southerly course of twenty-five miles further, or to the neighbourhood of Umbala ; thence for seventy miles, or to the borders of Hureeana, its direction is South Westerly, while onwards, for 170 miles, or until it is lost in the sands of Rajpootana, its course is mainly West, inclining

* This characteristic has been enlarged upon by Mr. Hodgson, in the Journal Asiatic Society of Bengal, for August, 1849.

a little to the South. It is clearly traceable to Anoopgur, on the Beekaneer and Bahawulpoor boundary, which gives its distinct channel a length of 290 miles, but in recent times, it is not known, that a stream of water has proceeded beyond Bhutnee, or to within eighty miles of its present apparent termination. Tradition indeed represents, that in former days, when from* whatever cause, the river carried much more water than it has latterly done, it found its way to the ocean, the Indus, or the Sutlej † or to a branch of the last named river, which seems anciently to have entered the wastes from near Loodeeana,‡ curiosity and the fancy thus became equally interested in endeavouring to identify some of the long winding "Chitrangs" or "Duhurs," *i. e.* meads or flats, formed by the shifting and isolated sand hillocks of the desert with the legendary stream; but, as I have said, Anoopgur is the limit to which the distinct marks of a river can now be followed.§

* See Appendix A.

† Appendix B.

‡ Appendix C.

§ Appendix D.

3.—Of 290 miles, the total length of the Gugur, the hilly portion of twenty-five miles, runs through the Chiefships of Simoor and Kotaha, and the Pinjor district of Puteeala. After entering the plains its course lies for ninety-five miles through the Cis-Sutlej States, including several protected Chiefships and some British districts. In Hureeana and Bhuteeana the river has a course of ninety miles, and in Beekaneer, so far as it can be certainly traced, a course of eighty miles. The channel of the river in the hills need not be more particularly described, and has not indeed been examined, as, within the particular limits, no question has ever been raised about the use of its waters.

4.—From Chundeegur, where the Gugur turns South to leave the hills to Chut below Mobarikpoor, a distance of fifteen miles, the river has all the characteristics of a rapid and vari-

able mountain torrent. It carries large shingle for seven miles below Chundeegur, and small pebbles and coarse gravel to below Chut. At Chundeegur, its channel may be said to average 1,200 feet wide by twelve feet deep, and at Chut to measure 1,800 by six feet. These are the present breadths of the rainy season streams, but intermediately, and indeed as far as three miles below Chut, the river seems to shift about within a belt of a mile and somewhat more in width. At Chundeegur the descent of the bed is about forty-four feet per mile, and neither at this place nor onwards to a little below Chut, does the rapid current overflow its permanent banks, *i. e.*, the banks of its belt of variation, but the torrent is continually doing some local injury, or on the other hand, benefitting some stoney fields, by washing away the rich alluvium of one tract to re-deposit it elsewhere.

5.—After leaving Chut, the Gugur formerly flowed past Bunoor, and the old Imperial seraee, known as that of the Gugur, on the Umbala and Sirhind road. Between 1795 and 1803, A. D., however, the river gradually effected a change of direction, aided, perhaps, by artificial cuts of irrigation, by breaking into an affluent running parallel to it on the East, and its course is thus four or five miles nearer to Umbala than before.* Immediately below Chut, the bed rapidly narrows and deepens, and although the channels being new, seems scarcely to have attained its limit of size, its relative character, as far as Maroo, a distance of twenty-five miles, is, that the banks undergo little annual change, but are subject, each year, with rare exceptions, to two or three or more, fertilizing overflows, especially in the lower portions of the sub-division now treated of. Within the distance specified, the sections decrease from about 700 feet

* I was unable to satisfy myself from verbal enquiries where the new stream rejoined the old channel. Our ordinary maps, founded mainly in this particular, on what was learnt on the first extension of our power beyond the Jumna, take one branch of the Gugur immediately west of Puteeala, and thence into another branch, or the main stream half way between that town and the Hureeana border. The lower portion of the present Puteeala "nula" is thus perhaps part of the channel of the old Gugur.

by ten and fifteen, just below Chut, to 350 by eleven, opposite Umbala, and to 250 by eight and ten near Maroo. The channel usually exhibits a bottom of red sand, but being still in process of excavation, deep pools and clayey projections are more common, than may be the case hereafter, when the river shall have settled itself in its bed. Quicksands are frequently met with, and while a stream continues to flow, the only certainly safe passages for strangers, are those used by the neighbouring villagers, or which occur on high roads. Opposite Umbala, the descent of the bed and fall of the country are each two feet in the mile.

6.—Soon after passing Maroo, the Gugur enters a hollow or low level about ten miles in length by seven or eight in breadth. During floods from the hills, the river becomes, in this basin, a mere moving inundation, spreading over the country to a depth of from one to four feet, and on the subsidence of the waters, it is seen, that no well-defined bed exists in the central portions. Below Maroo, the section is 200 feet, by eight, but the one channel soon becomes divided into several sandy tracts little lower than the fields which they traverse. These belts of sand shew the direction of the dispersion of the waters of inferior floods, and their number has been increased by the tendency of the main current to raise its temporary channel, and then to seek a lower level in a given distance by enlarging an irrigation cut. Thus, Major Baker, who levelled across the tract in 1840, depicts nine branches, besides the main channel and artificial water-courses*. These streamlets, however, cannot leave their basin, or cross over the ridges, separating the Gugur on the one hand from the Umbala, and on the other hand from the Puteeala river, and thus at the end of ten miles near Boonerheree, they are found united

* It is likely that Major Baker or his draftsman, has included some branches of the Taugnee river among the particular nine of his Map. but had he crossed a little higher up or lower down, he might have found even more than nine branches, or have been puzzled to distinguish them from water-courses.

in one marked channel, seventy feet wide and fifteen feet deep, which is liable, however, to frequent overflows as insufficient in section. The centre of this hollow is likewise the line of separation between the light but rich red soil of the plains skirting the hills, and of the tenacious grey loam which stretches along the rivers towards the desert, and which, if adequately watered, is considered especially favorable to the production of rice.

7.—From Boonerheree to Badshapoor, a distance of twenty-five miles, the surface of the country undulates, but it rises upon the whole, or at least, rises more rapidly than the river-falls, so that the Gugur eventually shews a channel 140 feet wide by twenty-nine feet deep, the greatest depth any where observed. Between the two places mentioned, the practice of forming dams and cuts has helped or caused the river to strike out several new courses for itself, which, however, are all contained in a belt of from three to four miles in width, and of which some one is usually for a time the markedly principal stream. In this space the river annually overflows its banks opposite Arnowlee, where indeed the section does not exceed sixty feet by twelve, and the flood occasionally rises to the edge even at Badshapoor where deepest. It may also be mentioned that this sub-division of the Gugur receives the Puteeala river on the right and the Umbala stream on the left.

8.—From Badshapoor to Ruteea, in Hureeana, a distance of forty miles, the section of the Gugur gradually decreases to eighty-five feet by twelve and a half at Moonuk, and to 100 feet by five only at Ruteea itself. It still, however, exhibits two or more channels, excepting for ten miles between Khang and Poolad, and as the banks decrease in height so do they become more liable to be regularly overflowed. Gradually also remote outer banks, defining the limits of the annual inundation, begin to show themselves, and the sunken tract so formed, which is

irregular in shape, and varies from half a mile to near two miles in width, is distinguished by a particular name from the dry lands on either side, although if these become artificially irrigated they are likewise so far included under the same designation. In the Cis-Sutlej States and in Hureeana, it is called " Dabun," and in Bhuteeana and Beekaneer, the word " Sotur" is used, as is also the term " Duhur" although this last means more especially " rice lands." About eight miles below Badshapoor, the united streams of the Sursootee and Markunda join the Gugur, but at Poolud, sixteen miles farther on, the main river which intermediately has likewise been joined by a branch so as to include all in one bed, again divides into two, of which the northern and longer channel is considered to be the Gugur proper, while the southern or smaller is called the " Choya" *i. e.*, simply the streamlet or branch.

9.—From Ruteea to near Bhutneer, a distance of seventy miles, the Gugur is a mere depression, showing indeed, here and there, a small central channel, but chiefly characterized by a series of pools or local basins, one of which, viz., the lake at Dhunoor, near Sirsa, contains water all the year round. The general hollow or course of the flooded river, varies from eight and ten to seventeen and twenty feet in depth, with a breadth differing every here and there, but ranging from about half a mile to two miles. The general slope of the country would seem to be about a foot and a quarter in the mile. A little below Sirsa, or about twenty miles above Bhutneer, the Choya branch can be traced to have rejoined the main river as it would doubtless do again were it well supplied with water. Like the main river, the Choya is a long sinuous hollow with here and there a central channel. The depression is, however, double the width of that of the Gugur, but only about half as deep*.

* Colonel Cheape's Report of the 27th March, 1840, and Major Baker's of the 17th September, 1841, especially the latter with its plans, sections, and many details, are the best authorities for this part of the Gugur.

10.—From near Bhutneer to Anoopgur, distance of about eighty miles, the river, or what once deserved such a name, is merely a dry hard-bottomed depression between ranges of sand hillocks. It no longer includes a small central channel, to show the presence of an annual stream or a succession of pools or deep reaches, to show the excavating powers of floods. The depression is, however, marked by its abundant produce of grass and bushes relatively to the desert on either side. The width of the valley averages from two to four miles, and the hillocks are often found fifty and sixty feet in height, while most of them being comparatively well covered with creepers and other plants, do not materially shift their position like the hillocks of loose sand in the absolute desert. The direction of the hollow, moreover, being nearly on a parallel of latitude, and the prevailing winds of the dry season being westerly, the channel is the less liable to obliteration by drifting sand. At Soorutgur, or rather about twenty-two miles below Bhutneer, the Chitung can be traced to have joined the Gugur. The former river is commonly called the "Hukra" in Beekaneer, and indeed, below Soorutgur, the designation of Gugur is lost, and the traditional river of the desert, is talked of by the people, under the present name of its ancient tributary, or as before mentioned, it is simply called the Chitrang or the "Mead."

Colonel Cheape considers the Choya as originally an artificial canal, but it was more probably the separate bed of the Sursootee, before that river joined the Gugur, where or near where it now does. Subsequently, indeed, the deserted bed may have been improved into a canal. The fact that Sirsa is called Sursootee by old Mahomedan writers, and even by people generally at the present day, (compare Sir H. Elliot's Glossary of Indian terms Art.) Bhuteeana gives weight to the opinion that the present Choya or streamlet on which it stands, is the original Sursootee. Major Brown (Report of 4th July, 1840,) seems to think that anciently the Sursootee may have proved southerly into the Chutung, near Hansee, and such may at least have been the course of abranch which quitted the main river below Pehoa.

11.—*The Sursootee*, which is so celebrated in the heroic and religious history of the Hindoos, is a small river, compared with the Gugur. Its whole course, from the base of the outer hills to its junction with the Gugur, does not exceed eighty-five

miles. Near Pehoa, however, or about twenty-five miles from its mouth it is increased by the waters of the Markunda, a river much exceeding it in size, and thus, during the rainy season, it exhibits, in its lower portion, a stream not greatly inferior to that into which it flows. The Sursootee, however, is not like the Gugur and Markunda, an impetuous mountain torrent; its sources are almost in the plains, and its course lies along low alluvial flats. As a river, it thus no where exhibits a capacious section; it is not self-contained, and at the end of a few miles, after heavy rains, it is rather a slow moving inundation than a defined and rapid running river. Neither does it carry much alluvium, and thus it neither by its violence, causes the injury in its upper, nor by its deposits confers the benefit in its middle course which characterizes the Gugur. A little below Belaspoor, or about sixteen miles from its source, the Sursootee is joined by the Chitung, coming from the *Westward*, and onwards for another sixteen miles, the stream seems to be called indifferently by either name. Near Ludwa, a separation takes place, but the rivers are made to cross, or the *Eastern* branch becomes the Chitung, and the Western the Sursootee. This apparent confusion of nomenclature is increased by the existence of intercommunicating channels, and by the proximity of a third stream, the Kakshee, flowing to the *eastward*, of both rivers, but connected with them during floods. Below Ludwa, however, all three become distinct. The Sursootee runs westerly by way of Tanesur and Pehoa into the Gugur; the Chitung holds the middle course, and the Kakshee keeps to the eastward, but both of these latter streams unite, and soon after both are lost in Feroz Shah's canal, by perhaps two mouths, one apparently near Sufeedon, and the other lower down at Dhatrut in the parallel of Paneeput.* The Sursootee does not supply the "Lukshmee Sur" or great tank at Taneesur, as is commonly supposed to be the case, perhaps from the nearness of the two, but the pool of a less known place of pilgrimage, the "Sthan-teerut" is filled by the river. One of the first Sikh

* Appendix E.

possessors did indeed attempt to feed the great reservoir from the river, and the remains of the cut which he made are still visible, but at present the tank depends on the drainage of the country, or upon an occasional stream from the Chitung, which can be more conveniently brought into it than one from the Sursootee itself.

12.—Opposite Ladwa, the Sursootee shows a section of thirty feet by eleven, and it there floods its valley to a depth varying from one to four feet and more, and to a width of from a furlong to three-quarters of a mile. At Tanesur, the bridge built by the late Raja of Ladwa is insufficient, with its three arches of thirty-three feet span each, aided by several road drains, to carry off the flood, and an unusual inundation thus passes freely over the highway. Where joined by the Markunda, the Sursootee is forty-five feet by eleven, while the Markunda itself is fifty feet by fourteen, and the banks of both rivers are flooded to a depth of one and two and even three feet. At Pehoa, the bridge ascribed to the celebrated Todur Mul of Akber's reign, gives an insufficient passage of thirty feet by thirteen, and heavy rain throws the country under water for a mile and more in breadth, but especially on the northern side. Below Pehoa, the country falls so as to diminish the section of the river until it cuts through the sloping and comparatively high bank of the Gugur, and thus, at the broken bridge of Polur, the measurements are seventy-five feet by nine ; at Ber-Jhuk, the western limit of Koolchetr (Khurukshetr, the scene of Kooroo's great oblation, and of the Muhabharut contest,) there are thirty-five by five only, but on entering the Gugur, the mouth is found to be 100 feet wide, and twenty-two feet deep. Thus during the rainy season, the river below Pehoa is at intervals, but sometimes for days together, one continuous flood. The practice of forming dams and water-courses, has also caused the river to strike out for itself a variety of channels which meander here and there, within the limits of the half

natural half artificial inundation, or of the "Dabun" land which varies in breadth from one to four and five miles.

## *II.—The Dry-weather streams and Rainy-season Floods of the Rivers.*

13.—As the sources of the *Gugur* lie fairly within the Himalayas, and as it drains such lofty mountains as Kusoolee and Dugshaee, its broad stoney bed possesses a slender meandering current even during the driest months of the year. This stream, however, does not extend after the occasional rains of spring, *i. e.* ordinarily after April, further down than Chut, which is only fifteen miles from the outermost range of hills. Within this distance the depth of detritus in the bed continually decreases to a minimum, and the mountain ridges being near the water, after percolating through the talus of the Sewalik range, appears in the shape of springs in the river-bed, so that at Moobarikpoor, for instance, the quantity of surface water often exceeds that higher up, although intermediately much has been drawn off for irrigation and absorbed by a burning atmosphere. During the cold season, or until the end of March, as a limit, a stream ordinarily reaches as far as the low level between Maroo and Booneerheree, about forty-five miles from the hills, but there it is finally dispersed, and although after the resumption or reformation of a channel on quitting that hollow, a trickling current may be observed even in April, such is due to slender land-springs, and not to a continuous flow from the Himalayas.* Hence the only certain hot-weather stream of the Gugur is that which reaches as far as Chut, below

* Major Baker (para. 17, report of 1841,) seems to think that if the river were no where dammed during the dry season, about a third of the stream might reach Hureeana. In the spring of the present year, however, copious rains rendered artificial irrigation almost unnecessary, and very little water was withdrawn from the river, yet the large remainder was wholly absorbed in the Doorsh Mehmoodpoor hollow. The Revenue Survey map of the Gugur, exhibits the current as ceasing some miles above Umbala, and even were all the dams destroyed, it is doubtful whether it would reach much below that place in the hot months of ordinary seasons.

which copious springs are not found, and any under-current due to percolation remains hidden in sandy banks or becomes occasionally visible in a few isolated and deep pools.

14.—In the wet and sometimes in the cold season, the stream of the Gugur, is as copious and useful, as during the hot season, it is slender and insufficient. This is especially the case during a fresh from the hills, or after prolonged rain in the upper plains. Such brimming floods usually occur three or four times in the autumn, and perhaps twice in the winter or early spring. In July, August and part of September, the river is frequently so swollen, as to detain travellers, and to render the use of boats necessary near Umbala, and likewise in the deep channel near Badshapoor. Still so temporary is an abundant supply, and so great is the consumption of water in irrigating the dry arid plains of the central and lower portions of the river's course, where comparatively little rain ever falls, that, as has already been mentioned, the stream has not recently been known to proceed beyond Bhutneer, and seems indeed only to reach that place once in two years on an average.*

* Mr. Vans Agnew, in his report of 27th Oct., 1844, says, the current had got as far as Bhutneer ten times during the preceeding twenty two years.

15.—As the *Sursootee* does not rise within the lower ranges of hills, nor drain any lofty mountains, its upper course is rather a surface indentation than a well-defined channel, containing deep layers of detritus separate from that of the " talus" of the hills, for the conveyance of a perennial supply of water by percolation to a distance from its source. In the dry season, the Sursootee is fed by land-springs only, and these can merely keep up a trickling stream for a short distance, until it is absorbed by a stratum of sandy soil, or arrested by a petty dam to form a cattle pond. From the same causes the floods of the Sursootee, during the wet and cold seasons are proportionally less frequent, and abundant than those of the Gugur, until indeed, it is

joined by the Markunda which drains the heights of Jaeetuk and Nahun, so familiar to us since the Goorka war of 1814. The accession of that stream, however, so increases the volume of the Sursootee, that in Hureeana the peasantry almost regard it as superior to the Gugur.

## III.—On the uses made of the Waters of the Rivers.

16.—*Of the uses of the Gugur.* The country along the foot of the Sub-Himalayas, although called a plain, is not strictly so, but exhibits rather a series of downs or undulations, merging in the plains proper at a distance of twelve or fifteen miles. The tract in question forms a sort of "talus" or softening off, to the abrupt hills, and especially in the hollows, it is composed for the greater part of a coarse debris, covered, however, in most places with a stratum of earth, the accumulation of ages. Occasionally slightly-raised ridges of the old diluvial soil of the country, intervene as spurs from the Sub-Himalayas, and form the limits of the basins of the petty torrents which rise within or at the skirts of the hills. In neither soil, whether old diluvium or more recent debris, is water to be found near at hand, and hence every effort is made, particularly in the spring, to derive benefit from such rivers as maintain a current for the whole or the greater part of the year. The right to irrigation from the Gugur, during the cold and hot months, is thus a source of dispute between different parties as far as Chut and its neighbourhood, to which point its stream is constant. Below Chut, the supply is too uncertain to make it valuable, although the Raja of Puteeala has, in two places, made cuts to draw off the stream when the seasons prove favorable, and the quantity continues abundant. Generally speaking, however, from Chut to Bhutneer, the only permanent and sure use to which the river can be put after the rains, is to fill ponds for watering cattle, or for irrigating patches of cultivation either artificially where the channel is narrow and deep, or by the natural descent of rills from the damned-up flood, where the bed becomes a mere hollow.

17.—The rainy weather freshes or floods of the Gugur are required by different parties from those using the dry season stream, and the waters are likewise applied to the purposes of agriculture in a different manner. As far as Chut, the river is self-contained, and its current is too impetuous to admit of the construction of dams ; or of being otherwise readily led into side cuts. The skirts of the hills, moreover, are usually well saturated with rain, and an artificial supply of water is not necessary, either to prepare the ground for the reception of seed or to nourish the growing crops. Below Chut, and as far as Maroo, the stream still continues too rapid to allow of earthen dams being thrown across it, but it nearly every where overtops its banks within these limits, and as it is largely loaded with fine earth, its inundations are welcomed by the peasantry, not indeed, as absolutely essential, but as a source of additional benefit. The advantage conferred is two-fold, the soil is completely saturated with water independent of rain, and its fertility is increased by the deposit of a film, and in some places of a layer two or more inches thick, of rich alluvium locally known by the name of "D'hoor." The river does not carry this coveted "D'hoor" in any important quantity more than a few miles below Maroo, but as its rapidity decreases its stream comes more under control, and it is from Maroo downwards that the system of erecting dams begins. The waters of a flood, moreover, always contain *some* earths and salts in suspension or solution, and as, to the south of Puteeala city, the rains are frequently scanty, and but rarely copious, a season of good river-floods is anxiously looked for by the population. In Hureeana, and in the neighbouring lands of Kaeethul and Puteeala, it is considered that without the aid of the river-water, even a fair winter crop cannot be obtained ; and hence in these tracts wheat and pulse are only found cultivated within the limits of this fluvial irrigation or in a few natural hollows affording a moist bottom. The river-floods are required mainly to soften the soil for the plough, but partly to increase fertility by mechanical deposits or chemical action. For the former

essential purpose of saturation, the Zumeendars loudly declare the autumn rains to be wholly insufficient, and as they are too poor to be able, and too indolent to be much inclined, to sink wells where the water is deep and scanty, and the soil bad, they have been accustomed to put their trust in the Gugur, and have thus become sensitively alive to any interference with its stream.* Hence in its small upper section, the Gugur is wanted for spring irrigation; in its larger middle section it is valued for its fertilizing deposits, and in its extensive lower section, it is absolutely required to soften a hard and burnt up soil but little visited by rain. It is likewise, however, put to other but subordinate uses. Thus so long as it has a running stream, or ponds can be maintained in its bed, it is preferred for watering cattle, and partially used for irrigation by means of various mechanical contrivances. In its lower portions again, it is employed during the rainy season in raising crops of rice, and could a larger and more certain supply of water be poured down its channel, the advantage of the river would be doubled. Lastly, where the stream is perennial, and the fall considerable, or as far as Chut, small mills are every where erected for grinding corn, es-

* The reports of the local authorities and of the scientific officers, deputed to examine the country, are unanimous as to the importance of the Gugur for agricultural purposes, the scantiness of the rains and the depths of wells, rendering the aid of the river necessary to cultivation. Capt. Brown points out, that in Bhuteeana the wells in flooded lands are 30 and 40 feet deep, and elsewhere from 80 to 200 feet, that brackish water is often found, that the supply is always scanty, and that the foundations of wells are frequently insecure. owing to the thickness of the incompact beds of sand on which they are built. (Report of 1841, para. 27-31.) These remarks are equally applicable to the southern portions of the Cis-Sutlej States. It is also to be observed, however, that the peasants as a body have not the industry of those of the Ganges where although rain is more abundant, irrigation from deep wells is commonly practised. The difficulties in the way of efficient agriculture, and the peculiarities of temper or fortune of the people have had a mutual re-action, and the result is in the one case bad ploughing, careless weeding and watering, and in the other a combination, of indolence and indifference which provokes the anxious and busy English authorities in India, and is a subject of observation among the petty officials from the neighbouring eastern Doab. In these tracts an outlay of capital on the part of the proprietor of the soil, i. e., virtually on the part of the Government is, even more essential than elsewhere to make agriculture as profitable as it might be, and to imbue the people with habits of prudence and an emulous spirit of industry.

pecially during the dry and hot seasons when the water is fully under command.

18.—*Of the uses of the Sursootee.*—The irrigation from this river need not be described in detail after what has been said about the Gugur. It has no cold-weather stream, and the land-springs of its bed are either wholly disregarded or collected into small pools to water cattle and irrigate patches of cultivation. During the rains, its waters are as much sought after as those of the Gugur, to nourish rice fields, where the stream is copious and lasting, or to soften the baked soil of the districts, of its lower course, where its current is more abundant and less under command. It holds little earth in solution, and it is thus valued chiefly because rain is less certain and plentiful than could be desired.

19.—*The irrigation cuts and dams of the Gugur and Sursootee.*—In the upper section of the *Gugur*, that is from the hills to Chut, the fall of the river is considerable, and the stream spreads over shingle and sand. The dams in use for diverting the current are thus insignificant although effective. They are sometimes no more than six inches high, and they rarely, if ever, exceed a foot and a half. In length they vary from twenty to a hundred feet. They are composed simply of sand or of loose stones and gravel bound together with shrubs. Every fresh from the hills injures them or washes them away, and the work of repair or renewal recommences as soon as the river falls. The cuts, however, into which these dams turn the water, are of a permanent character, excepting at their immediate heads; for as the banks of the stream are liable to alteration, and as the position of the dams must frequently be changed so as fairly to catch a current meandering along a broad channel, the entrances to the cuts have likewise to be altered. The cuts themselves vary from three feet in width and one foot in depth, to four times these dimensions, and some of them, as those leading towards

Muneemajra, are carried with some art over the spurs of the inferior hills. In the lower portions of the Gugur within the limits of the Cis-Sutlej-States, the dams used for forming cattle ponds, &c., are equally insignificant in character as those above described. They are not longer than from fifty to 100 feet, nor higher than two and three feet. In Hureeana again, and in Bhuteeana, where the river is rather a broad depression than a narrow well-defined channel, the dams employed to secure a supply of water for some months of the cold and warm seasons are of a more substantial character, and some of them would, indeed, also seem to be used for directing the autumn floods into low levels.* The dry season dams of the *Sursootee* are of the same slight and temporary description, as those used in the Gugur in the Cis-Sutlej States.

* Compare Major Baker's Report of 1841, para. 22 and 24.

20.—The methods of irrigation in use on both rivers during the rainy season are rude and wasteful in the extreme.†— These methods consist; *first*—in arresting the course of the stream by means of an earthen dam, and *second*, in directing the raised water towards particular villages, by means of shallow cuts varying from one to three feet in depth. As, however, these petty courses are altogether unequal to the dispersion of the mass of waters forcibly thrown out of the natural channel, the neighbouring tract of country becomes flooded to a greater extent than is necessary, while lower down, the villagers have for the time to be content with the use of such water, as again accumulates in the river bed, after a needless consumption by evaporation, by absorption in untilled lands, and by retention in hollows. Where the river runs for some distance through one jurisdiction, the use of these dams is commonly so regulated as to give to one set of villages the benefit of one fresh, and to another set the use of a second flood, but where chiefships or

† Late in the season they are also prejudicial should the river be suddenly flooded. The rising crops are thrown under water and greatly injured or wholly destroyed.

districts are intermixed, this reasonable practice is but little attended to. Generally speaking, however, the dams are only intended to be of temporary use even during one season, and hence, the chiefs and even in a greater degree our own Government, have left the labor of erection, almost entirely in the hands of the villagers; and it is only, where the rapidity and depth of the current renders works of unusual magnitude necessary, or where some special object is to be gained, that the state gives its aid either in payment, in superintendence, or in bringing together sufficient numbers of laborers. It is obvious that even a few associated villages can of themselves only perform works of a simple character and easy execution, and hence, it is not until the rivers lose the characters of torrents, that any attempt is made to arrest them bodily. The dams indeed are mostly in use, where the lands are naturally flooded, by the greater rushes from the hills, for there the inferior force of common floods allows them to be easily turned, and the flatness of the country facilitates the irrigation of tracts remote from the river. On the other hand, wherever a rise in the country causes the waters to be collected in one deep channel, it may be observed that few or no dams are met with, although the adjoining high lands are greatly in want of moisture. To erect them is beyond the power of the villagers, and when the state gives its aid, they have so often been washed away, when half finished, that there is a reluctance to engage in undertakings of the kind.

21.—The slight construction of the dams, and the fact that they are mostly in use in natural flats or hollows, show that the waters of the rivers, although not used with economy, are neither lost, nor so completely monopolized as is commonly understood. Any great flood washes the dams away; and even when they stand uninjured, the natural tendency of the forcibly-diverted stream is to return to its old and central channel. That the great mass of waters do once more collect, and form rivers is evident from the deep beds of the Gugur on

quitting the Maroo and Doordh-Mehmoodpoor basin, and of the Sursootee, on leaving the low level of Ber Jhuk. The dams, however, effectually impede the petty swellings of the rivers which take place between the larger floods, and as in the beginning of the season the soil is dry, an ordinary fresh may frequently be wholly absorbed in the neighbourhood of the dams first met with. The number of freshes again which may occur during any one season is so uncertain, and each village is so desirous of deriving benefit from the earlier floods, lest they should be the only ones, that the people of the lower course of the rivers loudly protest against the obstructive works of those residing higher up. The only dams however, which really diverts a large body of the water of either river is that across the Sursootee at *Pehoa.**

* The views expressed in this paragraph about the injury caused by dams in actual use on the rivers may be compared with Major Baker's Statement, para. 17 of his Report of 17th Sept., 1841, founded apparently on Lieut. Strachey's observations which I have not seen.

22.—In the *Gugur* the practice of forming annual dams commences at Maroo about sixteen miles below Umbala, and so far at the Cis-Sutlej States, and the *main channel* of the river are concerned, it may almost be said to cease at Doordh-Mehmoodpoor, opposite Arnowlee, about sixteen miles lower down†. Below that place there are not at present any dams across the main stream in the Puteeala Territory, owing partly to the difficulty of erecting them, and partly to our injunctions against impeding the stream. Similarly in the Kaecthul district, the main channel of the Gugur is now

† The dam at Maroo is of some importance. It intercepts the stream before it spreads in the low level further down, and thus a good head is obtained for villages to the right and left. The dam at Doordh-Mehmoodpoor, intercepts the stream before the river channel becomes much sunken in a sort of wood bank or ridge of land, and thus a head is secured for irrigating part of the comparatively high tract in question belonging to Puteeala, Kaeethul and Arnowlee. In the low tract described in para. 6, the levels are favorable to drawing off the water with little aid from dams, and thus the inland towns of Musingham and Ghoram are irrigated by simple cuts branching off some miles above.

Both at Maroo and at Doordh-Mehmoodpoor, the creation of dams has led to the formation of new channels, and at each place two dams are therefore necessary. At Maroo, the old channel requires a dam of 150 feet long by 8 feet high, the new one of 180 by 12 feet. At Doordh-Mehmoodpoor, each dam is 60 feet by 9 feet. All these dams are about 6 feet wide at top, but then the thickness at bottom bears no regular proportion to other dimensions. On an everage, the base of the sloping sides seems nearly equal to the height. The dams are made high enough above the fall of the country to prevent their being overtopped, or from two to three feet above the river banks.

without dams, although one of a large size, and permanent character. guarded by a tower still standing, was attempted to be built at Krahul, about forty years ago, by Baee Lal Sing, the chief, and a smaller one at Tutceana, (or Tityana,) was only finally washed away during the last three or four years. In *branches* of the main channel, however, there are, both in the Puteeala and Kaeethul districts, some small " bunds." In Hureeana and Buteeana, dams appear to have been extensively used in 1841, and indeed both Major Baker and Colonel Cheape, say that without them the full use of the water could not be easily obtained. Most of these are of small size, merely sufficient to fairly turn the stream down a cut, but a few seem to be of considerable extent.*

* Major Baker's report of 27th Sept., 1841, and Colonel Cheape's report of the 27th March, 1840.

23.—In the *Sursootee,* the practice of erecting dams formerly commenced almost at its source, and still continues throughout its lower half. In the upper portion of the river, our repeated injunctions against the use of such " bunds" have diminished their numbers, but lower down, or in the Kaeethul district, every village near the river has its seperate dams or its share in one common to several townships. As has been mentioned, however, the character of the river is such, that in nearly every instance works of very insignificant dimensions answer the desired purpose, and as moreover, their site is frequently changed, and old and new are equally in a state of disrepair during the dry season, it is neither easy to ascertain how many are in use at any one time, nor necessary to give a description of such petty embankments of earth. Three only of the Sursootee dams need be specially referred to :—

I.—At Sooltanpoor, in Ladwa, the late Raja threw a dam across a connecting channel, so as once more to cause the ordinary stream of the Sursootee to flow into the Chitung. This did not much diminish the volume of a "fresh," but it nevertheless lessened the utility of the river, and after repeated remonstrances, the Chief finally ceased in 1844, to interfere with the natural flow of the waters.

II.—At Pehoa, the late Chief of Kaeethul, commenced about 1836, the erection of a masonry dam for the purpose of irrigating certain villages between that place and Kaeethul which had lapsed by the death of a feudal retainer, and also for the purpose ofeffectually filling the lake which surrounded Kaeethul itself. As however, his own villages lower down the natural stream would suffer, if the whole of the water were diverted, he provided an overflow channel, but not in a very skilful or durable way. He had not properly understood the character of the river he sought to control ; his masonry dam proved insufficient, and the outlet speedily became as large as the original Sursootee. This led to the erection of extensive earthen dams across the old and the new channels, which are still maintained by the British authorities, and the consequence is the material diminution of the stream of the Sursootee below Pehoa, during the rainy season, and the loud complaints of all the parties affected between that place and Sirsa.*

* The dam across the old channel is 150 feet long by 19 feet high, and that across the new channel is 310 feet by 16.

III.—In following the Sursootee, the Kaeethul district ceases a few miles before that river joins the Gugur, and marches with the Puteeala territory. The Puteeala frontier village is Bher Jhuk, reputed holy as one of the corners of the "field of Kooroo," and the Puteeala Chief has always desired to keep the sacred reservoir of the place properly supplied, as well as to have his village sufficiently irrigated. Between the two Chiefs, a grudge existed, and the Oodeh Sing of Kaeethul, threw a dam across the

Sursootee, which at least deprived Bher Jhuk of the free use of the ordinary stream, although it could not interfere with the irrigation of the lands during considerable floods. This dam still exists guarded by a tower of brick, but it is maintained rather by the villagers than by the British Government. It is of small dimensions, the channel of the river not being above thirty-five feet by five and half in section.

## *IV.—Chiefships and Districts claiming the use of the Perennial Stream of the Gugur during the dry season :—*

24.—In the space of fifteen miles between the exit of the Gugur from the hills and the point where the perennial stream ceases, there are five different parties affected, viz :—

I.—Puteeala, the largest of the Sikh Chiefships, and which holds districts on either side of the Gugur, both within the hills and along its course as far as the Hureeana border, interrupted, however, here and there by other jurisdictions. The Puteeala districts claiming the use of the dry-weather stream of the Gugur, are Pinjor in the hills and Chut-Bunoor in the plains.

II.—The Hindoo Jat Chiefship of Muneemajra holding lands on the *right* bank only, and along the skirts of the lowermost hills. This Chief comprises the little feudal estate of Pubhat, the incumbent of which asserts independent rights.

III.—The Hindoo Rajpoot Chiefship of Ramgur, holding lands on the *left* bank of the river and immediately at the foot of the hills. The Chiefship is virtually divided into two or perhaps three different shares, the proprietors of which consider themselves independent of one another.

IV.—The Sikh Chiefship of Chichrowlee, at present held by Sobah Sing, Kulseea, and which possesses a detached district called Busee, lying on both sides of the Gugur below Muneemajra and above the Puteeala district of Chut Bunoor, and which also holds three villages on the right bank within Bunoor proper.

V.—The British "Talooka" of Mobarikpoor, lying along the left bank of the stream below Ramgur, and above Busee, but which also comprises some lands within the river bed, liable to annual increase or diminution from the effects of floods.

The claims of the different Chiefships are connected with their character or their fortunes, and some points in the history of each must therefore be briefly mentioned.

25.—I.—Puteeala has a revenue of more than twenty-two lakhs of rupees, and therefore exceeds ten-fold in wealth, and extent every remaining protected Chiefship while its power relatively to those concerned in the present inquiry is still more disproportionate. The district of Chut-Bunoor, is an old possession of this "Malwa" family of Sikhs, contemporaneous with the extension of Sikh rule, generally over the province of Sirhind, but as it is almost surrounded by the estates of Sikhs from "Manja" or the Punjab proper, and as for many years the ruler was imbecile and factious rife, it was deemed prudent by the perplexed Minister to waive rights, or not to press claims, which under other circumstances, the chiefship might have secured or enforced. Pinjor again was only finally acquired by Puteeala, in A. D. 1802, when General Perron having crushed the adventurer, George Thomas, sent his Deputy, Louis Bourquin, to establish Sindhia's authority over the Sirhind province. Bourquin found it convenient to make use of the pre-eminent family of Puteeala which had received dignities and power from Ahmed Shah Dooranee, and, to conciliate it, he let it occupy

Pinjor among other places claimed. Possession, however, being recent, and the country continuing distracted, the Raja had not time or opportunity to establish any exclusive rights, such as he afterwards advanced to the waters of the Gugur.

II.—The Muneemajra Chief, represents the family of one of the old revenue farmers of the Mogul Empire, which gradually acquired a hereditary interest in the revenues it collected, and eventually succeeded, in the instance in question, in securing to itself a property of 50,000 rupees' annual value, after the Sikh capture of Sirhind in 1763. An agricultural chief was fully alive to the advantage of irrigation. Gureeb Das, the founder, possessed ability, and local knowledge and influence, and Muneemajra thus speedily monopolized the whole of the dry-season waters of the Gugur, within its own limits, until Putteeala began to dispute the exclusive right.

III.—Ramgur is a petty estate of about 15,000 rupees annual value. It was founded by Khoosul Sing, the grandfather of the present chief proprietor, and who was himself a member of the hill family of Kuhloor, (Belaspoor). He took service with the Raja of Nahun, (Sirmoor,) and obtained, first as a feudal retainer, but eventually in independence, the little district which gave his chiefship its title. The power of the family, however, being small, and its position precarious, it acquired a right to a share in the Gugur waters, mainly through sufferance, and owing to the advantages of its position on the river bank.

IV.—Jodh Sing, Kulseea, the father of the present Sobha Sing, was an active, but turbulent leader of a division of the Krora-Singheea confederacy of Manjha Sikhs, which under the general command of Bughel Sing, possessed great authority in the Sirhind province, and which enriched itself by plundering the Doab and the districts east of the Ganges. Jodh Sing quarrelled with the Sikh proprietors of Busee and seized the estate for himself. He was regarded in some measure as the head of

the confederacy after Bughel Sing's death, and as he took service with Runjeet Sing, and was caressed by that politic ruler, his influence continued great, even after the extension of our supremacy to the Sutlej, although his own proper estate hardly exceeded a lakh of rupees a year in value. The position of Busee is such, that it gives to the holder the command of the Gugur, after its surface stream has been increased by the waters percolating through the coarse debris of the upper channel, and the Puteeala Raja found it convenient, rather to negotiate with Jodh Sing for the means of irrigating Chut-Bunoor, than to use force, or to claim as a right a share of the water in virtue of the lands which he held on the river bank.

V.—Mobarikpoor, was held for many years by a Sikh family, enjoying the title of "Nihung," implying Puritan or ascetic, and as its wants were small, its religious repute readily obtains for it as much water as was required for the irrigation of the low lying lands of Mobarikpoor proper, and of the adjoining village of Bunkerpoor. On the lapse of the estate to the British Government, the facilities of the Zumeendars for watering their fields were naturally increased by the dominant influence of our name, without the exercise of any direct authority on our part.

26.—Such are the present claimants to irrigation from the Gugur during the dry season; but it may be useful to add, what tradition represents to have been the practice when the tract formed part of the "Khalsa," or immediate possessions of the Delhi Empire. It is said, that under Aurungzeb and his first successors, the waters of the river were divided into five portions, of which one was allotted to Muneemajra, one to Chut, one to Bunoor, one to Busee, and one to Miscellaneous villages, such as Ramgur, Mobarikpoor, &c. This account is probable enough, for the four towns mentioned are all of such size, age, and position, as to warrant a belief, that the villages attach-

ed to them could secure a right to irrigation, or be equally regarded by their common master; while it was both necessary and usual, to set aside a share to meet the wants of Jageerdars and others, not placed under the control of local officers of revenue. That Ramgur and Mobarikpoor, however, were undoubtedly two of the villages enjoying this exceptional benefit, such enquiries as I could make do not enable me to determine. It is also to be remembered, with reference to present rights, that the four principal towns mentioned, have not now the same villages attached to them as under the Delhi Empire.

## *V.—Chiefships and Districts, irrigated from the Gugur and Sursootee in the wet season.*

27.—The floods of the *Gugur* become of importance to agriculture from the neighbourhood of Umbala downwards, but that British District, although a corner of it is intersected by the river, has no present interest in artificial irrigation, as the stream is too rapid to admit of easy control, and as it naturally floods the lands on either bank, two or three times in the year. Below Maroo, where the practice of erecting annual dams commences, a family of Sikh "Shuheeds," or martyrs, hold three villages* in co-partnership with the chief of Puteeala, but as the management seems to rest with the Maharaja, no separate claims have to be determined. The river, as regards its use by art, may thus be said to belong exclusively to Puteeala, from near Busee, (Chichrowlee,) to the neighbourhood of Arnowlee, the chief of which latter place is independent, and holds a few villages on both banks of the river. Below Arnowlee, the districts of Puteeala and Kaeethul become intermixed along the course of the Gugur as far as the junction of the Sursootee. Thence, both banks belong to Puteeala to below Moonuk, near which place the river enters the British districts, first of Hureeana and then of Bhuteeana, and the interest of

* Viz. Nugur, Sirkupra and Mulikpoor.

Puteeala in its water ceases, excepting in a projecting corner of land lying north of Sirsa, which is intersected by the main branch of the divided stream. After passing through Bhuteeana, Beekaneer is entered, and the waters of the most copious flood become absorbed within the limits of that principality. Hence, the chiefships and districts claiming rights of irrigation from the Gugur during the wet season, are :—

| | |
|---|---|
| I.—Puteeala ; | IV.—Hureeana ; |
| II.—Arnowlee ; | V.—Bhuteeana, and |
| III.—Kaeethul ; | VI.—Beekaneer ; |

Of which it is almost superfluous to state, that Kaeethul, Hureeana, and Bhuteeana, are British districts proper, and the other three dependent chiefships.

28.—In its upper course, the *Sursootee* traverses the petty jageers of Lehda, Moostafabad and Sekundra. It likewise runs through portions of the more considerable chiefships of Chichrowlee and Shahabad, and it also intersects the British possessions of Belaspoor and Ladwa. It then enters the district of Tanesur recently become wholly British, and after passing through some villages belonging to the Lady-Jageerdar of Bohur, and to the Burwaleean fraternity of Sikhs, both of its banks are included in the Kaeethul district, until within a few miles of its mouth, where the Puteeala territory is entered, and the junction with the Gugur takes place within the limits of that principality. In the highest portions of its course, the river does not seem to have been systematically used for irrigation, and in the Superintendent's office, there are no records of any dispute about its waters between the Jageerdars holding lands higher up than Ladwa, although the erection of a dam at Sekundra has been discontinued since 1844, when peremptory orders were issued for the destruction of all works of the kind which had not been regularly maintained from the period of the introduction of our rule. Similarly some of the dams, within Ladwa,

and all within Shahabad, seem of late to have been discontinued, while those in Tanesur, Bohur and Kaeethul, and even in the strip of Puteeala territory traversed, are still annually repaired or renewed, but rather at the discretion of the Zumeendars, than at the instance of the authorities. Hence at present, the only parties making use of the Sursootee floods by artificial means are :—

I.—The British Government for Ladwa, Tanesur and Kaeethul ;

II.—The Lady-Jageerdar of Bohur for three or four villages only ;

III.—The Burwaleean fraternity of Sikhs, for apparently one village only, and

IV.—The Rajah of Puteeala for five or six villages.

There are, however, other claimants to a share of the waters of the river, and as has already been mentioned, the inhabitants of Hureeana and Bhuteeana strongly object to the system still in force, and especially to the monopoly of the ordinary stream effected by means of the dam at Pehoa.

## IV.—*Summary of the views and orders of the British Government, regarding rights and methods of Irrigation.*

29.—The advantage of irrigating the dry soil of the Cis-Sutlej districts struck the observant, Sir David Ochterlony, soon after we received the Sikh Chiefs under our protection, and thus in 1810,* he wrote to Government, that the stream which joins the Sutlej near Rooper might be used to fertalize the country as far as Jagraon, and that similarly the Gugur might be employed in raising crops as far as Hansee, Sir David

* Sir D. Ochterlony, to Govt. 3rd May, 1810

Ochterlony, however, exaggerated the size and importance of the rivers, and for a number of years, neither he or the other local British authorities seem to have been aware of the use, actually and immemorially made of the Gugur for purposes of irrigation, nor to have distinguished between the different purposes, to which its dry and its wet season streams were and could be employed. But as the objections of some of the partizan leaders, who joined Lord Lake, to receive Hansee and Hisar as appanages, led to our assuming the direct management of these districts, and to our subsequent acquisition from the predatory Bhutees of the Futehabad and other estates, conflicting claims to irrigation came in due time before us for decision. The several tracts acquired had been impoverished by war, and were still suffering from the desolating drought of 1783, and the value of the Gugur floods became the more apparent. Hence, in 1812, if not before, the British authorities in Hureeana began to object to the use of dams by the Sikhs.* The orders which were first issued at that time distinctly and perseveringly required, that the Raja of Puteeala should destroy all existing works of the kind, and discontinue their erection for the future. These orders seem to have proceeded on the supposition that the river was a common property, which should be allowed to run uninterruptedly, and to benefit in its own way, or by natural flooding, every village on its banks. Such appear to have been the views of Sir Charles Metcalfe, who repeatedly enjoined the Puteeala Chief† to destroy certain dams, specifying those near the Hureeana border. These works were destroyed at the time, and they have not since been erected, except perhaps rarely and by stealth on the part of the Zumeendars, but the measure led to a virtual remonstrance on the part of Sir David Ochterlony, and to a representation, that it had been customary to dam the rivers in the Sikh territory, and that we could hardly claim

* Assistant to Resident at Delhi, to Sir D. Ochterlony, 3rd Sept., 1812.

† As for instance, under dates, 1st Aug., 2nd Sept., and 7th Oct., 1813.

more water than our predecessors, the Bhutees, had been able to secure.* Sir Charles Metcalfe, was then induced to say, that Puteeala need not deprive his subjects of the means of irrigation, but that the river should not be wholly obstructed, and that our subjects should derive some benefit from it.† Subsequently, Sir D. Ochterlony objected to a proposition for allowing the Sikhs, the precarious use of the stream *without dams*, for the benefit of Hureeana,‡ and this seems to have been the last of the opinions expressed by either of these eminent men regarding the *floods* of the river. With reference to the perennial or dry-weather current, Captain Birch, the Superintendent of Umbala, proposed, that dams should be erected to retain, in reservoirs, enough water for the consumption of Muneemajra and Puteeala, during the hot months, so as to render a division of the ever-fluctuating stream unnecessary, and Sir Charles Metcalfe, evidently thinking that the river flowed unfailingly all the year round as far as the desert, replied, that if enough water were allowed to pass on to Futehabad, such dams might be erected § On the same subject, Sir David Ochterlony, wrote to the effect,|| that a judicious system of dams was necessary for the Gugur, that we could give the science if the chiefs provided the money, and that if they would not do so, the river must be allowed to flow without interruption. This opinion seems almost to anticipate the necessity which has now arisen, and the kind of arrangement which must now be made.

* Sir D. Ochterlony to Resident, Delhi, 3rdOct., 1816.

† Resident, Delhi, to Sir D. Ochterlony. 10th Oct., 1816.

‡ Sir D. Ochterlony to Resident, Delhi, dated 4th Oct., 1847.

§ Sir C. Metcalfe, to Captain Birch, 7th June, 1818.

|| Sir D. Ochterlony to Capt. Birch, 28th Sept., 1819.

30.—The continuance of peace and good order, gave an impulse to agriculture, both in our own territories and in those of our dependents. The Sikhs stealthily erected dams, and the Zumeendars of Hureeana became more and more anx-

ious to obtain an extended use of the waters of the Gugur. In 1828,* the Resident at Delhi directed that, as usual, the Raja of Puteeala should be prevented from constructing dams near the British border, and at the same time, referred the general question of the right of one party to possess such works to the prejudice of another for the decision of Government. In reply, Government said,† that claims of the kind could be best settled by referring to established local usuage, that if the waters of a river had been enjoyed immemorially, the right could not be abrogated, and even that new dams might be erected, if the advantages of neighbours were not interfered with. This letter laid down an equitable principle, but it left local usage and customary rights to be ascertained or defined, and as such was not done nothing was settled. Hence the Agent at Delhi continued to urge,‡ that the Gugur be allowed to flow uninterruptedly into Hureeana, but Mr. Clerk, the Agent at Umbala, perhaps feeling that the requisition was somewhat arbitrary, and one-sided, desired to lay down a limit to such demands on Sikh compliance, and suggested§ that we could hardly require the chiefs to destroy works which were in existence before the extension of our supremacy over their country. This definite rule seems to have been acted on in practice ever since, and in 1844, it was formally recognized by the Government, North Western Provinces. It was then said,‖ the dams of 1808-9, might be maintained, but that no new ones should be erected, although, the understood occasional practice of drawing of the water near the hills, by means of cuts, unaided by dams, might likewise be continued.

* Resident at Delhi, to Agent at Umbala, 4th August, 1828.

† Govt. to Resident at Delhi, 5th September, 1828.

‡ For instance letter to Agent at Umbala, dated 27th July, 1834.

§ Mr. Clerk, to Agent at Delhi, dated 4th August, 1837.

‖ Govt. N. W. P., to Agent N. W. Frontier, dated 26th April, 1844.

31.—The above comprise the substance of the orders which have been issued, and the opinions which have been ex-

pressed, regarding the use generally of the *floods* of the Gugur, including, of course, its affluent, the Sursootee, but some notice is also required to be taken of the schemes for improving the irrigation of Hisar and Sirsa, by a scientific disposal of such water as entered these districts after passing through the Sikh States. In 1836, Colonel Colvin, the Superintendent of the Jumna Canals, was directed to report on the subject, and he represented,* that if the Puteeala chief allowed all the water, he did not actually want, to re-enter the Gugur instead of letting it run to waste, such surplus added to the streams, joining the river below the city of Puteeala, would provide a fair supply for extending the irrigation of our own districts by means of side-cuts. Colonel Colvin said, that no interference with the actual maintenance of *dams*, above (that is nearer the hills than) Puteeala, might be necessary, and he seems to have thought, that one existed at least, of right, lower down. In successive recapitulations, however, by departmental officers, Colonel Colvin's proposal became modified† into "a work for conducting the waters of the Gugur *below*," (*i. e.*, under the walls of) "Puteeala, without interfering "with the Sikh dams so as to irrigate Hureeana." This seemed to involve, as Mr. Clerk, the agent at Umbala, expressed it:—‡ "The formation of "cut or canal from the Gugur, high up, and "clearing all dams," and the matter being referred to the Raja of Puteeala, be objected to the undertaking, and nothing more seems to have been said about Sikh aid or forbearance. An officer, Captain Wakefield, was, however, deputed to see what could be done with the Gugur within our own proper limits,|| and he esti-

* Col. Colvin, to Sudur Board of Revenue, N. W. P., 1st Aug., 1836, compare Major Baker's Summary in his report of the 17th Sept., 1841, para. 3.

† Secy. Govt., N. W. P., to Agent at Delhi, dated 14th September, 1836.

‡ Mr. Clerk to Agent at Delhi, 21st Nov., 1836.

|| The attention of Major Brown, Rev. Surveyor, was likewise directed to the subject of irrigation

from the Gugur, and he furnished a report full of interesting particulars, under date the 4th July, 1840.

* Col. Cheape to Secretary Military Board, dated 27th March, 1840. Compare Major Baker's Report of 17th Sept., 1841, para. 4 and 5.

mated the cost of some side-cuts, for conducting the two branches of the river and for irrigating hollows, but Colonel Cheape, then Superintending Engineer, North Western Provinces, who was desired to report on the propositions said, that* sufficiently accurate information had not been obtained, and no works of the kind have yet been undertaken. With respect to the employment of dams generally, Colonel Cheape expressed himself to the effect, that without them, the full use of the waters could not be obtained, and he, at the same time, recommended the construction of a regulating dam at Phoolud, near Moonuk, so as to place the relative supply of the two branches of the river under control. A more extended enquiry was subsequently made by Major Baker, who in his report to the Superintending Engineer,† fully agreed with Colonel Cheape, as to the benefits derivable from the suggested regulating dam near Moonuk, and as to the necessity of a general recourse to dams, to ensure an adequate use of the stream. Major Baker, in his valuable report, likewise shows, how the Gugur might be re-inforced from the Sutlej; and brings to notice an excellent suggestion of Lieut. Strachey of the Engineers, for throwing the Jumna Canal into the Sursootee, (and Gugur,) during the rainy season, when it is not wanted in the Eastern districts of Delhi.

† Dated 17th September, 1841.

32.—From the reports of Colonel Cheape and Major Baker, two points requiring our consideration, as equitable and paramount rulers, are apparent, viz., that dams are in fact freely used in our own districts of Hisar and Sirsa, notwithstanding; *first*, our repeated objections to a recourse to them on the part of the Sikh Chiefs,‡ and, *secondly*, notwithstanding the reasonable claim of the Raja of Beekaneer to a share of the waters of a river, the channel of which

‡ The standing orders, however, in Hisar and Sirsa, regarding dams are, that none are to be

used, and instances were brought to my notice in which such works had been destroyed, and infractions of the rule punished by fine. Yet the testimony of Colonel Cheape and Major Baker, is positive, and the office records of the Superintendent of Bhuteeana, and the Collector of Hisar show, that dams were, occasionally at least, erected in the Upper District to the prejudice of the lower.

traverses his territory. Col. Cheape, (paras. 21 and 22,) describes a dam at a place called Tailware, and Major Baker, (paras. 22 and 24,) talks of one at Bana, and of a large one at a village named Nurail, and adds, that below Zeufrabad, there are many such works across the river-bed. The claims of the Raja at Beekaneer do not seem to have been formally recognized by Government at all, or to have been mentioned, of admitted by any administrative officer, save Captain Robinson, the superintendent of Bhuteeana, who transmitted a letter* from that Chief to the Raja of Puteeala on the subject, and Mr. Hamilton, when on a deputation to Bhawulpoor and Beekaneer, in the years 1843-44.† The only scientific officer, who appears to have considered the claims of Beekaneer, is Colonel Cheape, who, in the report already quoted, says that if the Puteeala dams were destroyed, Bhuteeana would indeed benefit; but that if such works were allowed in our own districts the waters might not reach Bhutneer, the border town of Beekaneer.

* Dated 17th May, 1843.

† See Mr. Hamilton to Government, dated 22nd January, 1844, on the receipt of which, both the Supreme and Agra Governments directed the general question to be taken into consideration by different local authorities.

33.—Regarding the use of the *dry*-season, perennial stream of the Gugur, we have hitherto only adjudicated definitively between the Chiefs of Muneemajra and Puteeala, while with reference to the claims of other parties, viz., the Chiefs of Chichrowlee, Ramgur, and our own Zumeendars of Mobarikpoor, we have been content with saying they should enjoy their ancient rights, without ever attempting to ascertain what these rights were, and, therefore, without establishing a rule or a criterion by which to adjust disputes. The Raja of Muneemajra claimed, and had occasionally monopolized,

the whole stream of the river as it skirted his territory, but the Raja of Puteeala urged the fact of his possession of lands above, below, and opposite to those of Muneemajra, and his consequent right to share in the waters of what he said was almost his own river. Various propositions were made by, and to the British Authorities, and the disputing chiefs, and Captain Birch, the local Superintendent, appears to have decided in the spring of 1818, that Muneemajra should have two-thirds of the stream and Puteeala one-third.* This division was approved by Sir D. Ochterlony, while Resident at Delhi, under date the 28th September, 1819, and it has ever since been upheld on occasions of reference. Practically, however, several difficulties have always existed in giving effect to the principle. Nothing was said about the place, or number of places, for drawing off the water, nor about a division of the river-bed. The Raja of Puteeala claimed the whole width of the channel, and desired to limit the Muneemajra chief to one head of water, for the object of the former was to conduct as large a stream as possible to the neighbourhood of Chut-Bunoor. The Muneemajra chief, likewise, claimed the river-bed, and desired to have several successive heads of water, as not only more convenient, but also in order that his share might be increased by the springs every where showing themselves in the shingly channel. Further it is not, at first sight, apparent, how the wants of *five* parties could be met, if *two* chiefs only were to share between them the whole of the stream. This seeming contradiction is explained, to some extent, by the circumstance, that the water, percolating underground, comes to the surface, as the strata of stones and gravel become thinner, so that, as has already been mentioned, the river shows as copious a stream at Mobarikpoor, for instance, as it does ten or twelve miles higher up, although much water has been intermediately withdrawn from it.

* Capt. Birch, to Sir D. Ochterlony, dated 16th Sept., 1819.

34.—Before the rival claims of Puteeala and Muneemajra, had been thus in part settled, the Raja of the former place and the chief of Chichrowlee, had come to an arrangement between themselves with regard to the irrigation of Chut-Bunoor and of Busee. In 1814, Sirdar Jodh Sing, directed his local officers to let Puteeala have one-half of the water, and on occasions of reference, both parties have been enjoined to adhere to this agreement, so that the once obvious superior right or power of the Chichrowlee chief, in this particular, has now become a simple equality. The arrangement, however, includes no details as to numbers and sites of heads of water, nor does it specify whether the irrigation of the Chitchrowlee villages, lying on the right bank of the Gugur, is to be provided out of the half in question or not. Neither have we ever given any decision on the subject, nor have we ever said how much of the assigned Puteeala share of one-third should be taken by Ramgur and Mobarikpoor, previous to the final division between Puteeala and Chichrowlee. The details of each claim, however, will be separately discussed in the next section, and nothing more need be said about them in this Summary Sketch.

35.—A general description of the Gugur and Sursootee, and of the claims of different parties, to the use of their waters has now been given, but before proceeding to the explanation of what I would recommend for the future, it is necessary to say a few words about the complaints which have been urged for years against the protected Sikh chiefs, and especially against the Puteeala Raja of selfishly endeavouring to monopolize the advantages derivable from the rivers. It has been perseveringly asserted, that not only have the ancient rights of the Zumeendars of Hureeana been abridged, but sometimes it has even been inconsistently surmised, that the long progressing desiccation of that tract of country is due to the acts of the recently established Sikh principalities. The

Raja of Puteeala, however, at once destroyed at our instance, and for our benefit, the dams which he had been accustomed to erect near the Hureeana border, and he has always freely allowed European officers, or their native subordinates, to examine the river, and to ascertain for themselves the extent to which he impeded the course of its stream. Thus in 1844, the Deputy Collector of Hisar, proceeded up the Gugur and Sursootee, but the only dams of any importance which he assigns to Puteeala are those at Badshapoor and Chut, the former a traditional rather than an existing dam, and one, which I could not ascertain, to have been renewed during the last seventy years ; the latter a petty bank for arresting the dry season stream of the Gugur near the hills. Again, an Ameen or Agent sent from Sirsa, includes in a list of Gugur dams which he submitted to me not more than three of any moment, and these are all at the foot of the hills, and in no way impede the flow of the only water, which can possibly reach Hureeana, viz., the water of freshes or floods. The only dams most effective in impeding the Gugur, (but that only to a partial extent even during minor floods,* are those at Maroo and Doordh-Mehmoodpoor, the upper and lower limits of the basin, or hollow, described in paragraph 6, and it is curious that they are not mentioned by the deputies sent from Hisar and Sirsa, the latter of whom is likewise silent about the dam at Futeeana on the Gugur in the Kaeethul district, which is described by Major Baker in the 16th para. of his Report of 1841. Neither are the Futeeana and Doordh-Mehmoodpoor dams mentioned in a list recently furnished by the Deputy Commissioner of Kaeethul, although both benefit the lands of that District, and finally a statement of Gugur dams supplied by the N. W. Frontier Agency, to Major Baker, in 1840, omits all, save those near the hills. These circumstances show partly, that the dams are periodically injured or destroyed, and partly that our enquiries

* See para. 21, for the actual amount of impediment or loss of water, caused by ordinary dams.

were not very carefully made,* but they also go to prove the slender foundation on which we have been accustomed to base grave charges against our dependents, and as the Puteeala Raja has likewise shown much moderation and forbearance, in his disputes with the present chiefs of Muneemajra and Chichrowlee, and with deceased chief of Kaeethul, I think it right thus specially to bring to notice his creditable behaviour generally with reference to the Gugur. The Raja is, indeed, the principal among the Sikh Chiefs, his titles and his power are nearly a century old, and he has thus no doubt, been moved by pride of family as much as by abstract considerations of propriety; but a sense of self-respect so useful deserves our commendation from whatever cause it may arise. The late chief of Kaeethul shewed less regard, both for his own reputation and for our orders, and the dam he erected at Pehoa, was, and still continues a real injury to the people of Puteeala and Hureeana. There had indeed always been a small embankment at the place, but he gave it the character of an entirely new work, by enlarging it so as to divert the whole of an ordinary flood towards Kaeethul, or completely out of the natural basin of the river, and it is worthy of notice, that he did this at the very time the principle was laid down of disallowing all works not in existence in 1808. The chief, however, is now dead, the greater part of his estate is in our hands, and his conduct requires no further animadversion. The same remark applies to the late Raja of Ladwa; and as the acts of the Chichrowlee and Muneemajra, and other chiefs, in no way affect the

* Major Baker, in his report of 17th Sept., 1841, refers, para. 17, to an examination made of the Sikh dams, by Lieut. Strachey of the Engineers. No list, however, is given of existing or annually renewed works. Of the lists quoted in the text, that of Hisar gives 19 dams on the Sursootee, and 9 on the Gugur. That of Sirsa specifies 25 on the Sursootee, and 18 on the Gugur, including, however, among the latter 14 dry season dams. The list of the Deputy Commissioner at Kaeethul, names 33 dams on the Sursootee, and one only on the Gugur. The Hisar and Sirsa lists are written in a running Persian hand, and hence, possibly, some of the dams that appear to be omitted, may have been originally entered but have become illegible or incapable of identification, owing to the errors of successive copyists.

general flow of the Gugur and Sursootee, their petty squabbles, preposterous assertions, and often unworthy evasions, do not deserve any special notice. We should always, in such matters, make ample allowance for their ignorance, for the absence of a high standard of feeling, and for the hostility which sometimes animates neighbouring land-holders even in more civilized countries.

### *VII.—Present recommendations in each case as to irrigation and other rights, connected with the upper portion of the Gugur in the dry season.*

36.—The chiefships and districts claiming a right to use the water of the upper Gugur have been described in para: 24, but for facility of reference, the names are here repeated in the margin,* and the following statement is also given of the nature of the rights on which a decision is now required :—

* Puteeala, Muneemajra, Ramgur, Chichrowlee, (Kulseea,) Mobarikpoor, (British.)

I.—The use of the stream of the river for Irrigation;

II.—The use of the stream for driving corn-mills;

III.—The right to the area of the river-bed, including the right to newly-formed lands;

IV.—The right to drift wood, limestone, &c.

37.—The claims to be first considered are those of *Muneemajra* with special reference to Puteeala, concerning which the orders and usages now in force are :— 1*st*, that Muneemajra is to have two-thirds, and Puteeala one-third of the stream ;† 2*d*, that the Muneemajra chief is to draw off his share of the water from one point only, viz: opposite Chundee, or at the junction of the Koosulea with the Gugur ;‡

† Captain Birch to Sir D. Ochterlony, dated 16th September, 1819, and Sir D. Ochterlony's reply of 28th Sept., 1819.

‡ Right as recognized by us, but according to usage the water is drawn off at two or more places.

*third,* that the river-bed is to be held a neutral tract;* *fourth,* that the corn-mills and accompanying patches of cultivation belonging to either party, are to continue as in 1847, whether situated in the river-bed or not,† and *Fifth,* that of drift-wood, transported limestone, &c., Muneemajra is to have two-thirds, and Puteeala one-third.‡

* Usage recognized for instance in Mr. Erskine's proceedings of 16th March, 1849.

† Decision of Mr. Wynyard, as Settlement Officer, dated 25th October, 1847.

‡ Proceedings of Mr. Clerk, dated 13th July, 1855.

38.—I.—With regard to the share of the stream enjoyed by either party, it does not seem advisable to disturb an arrangement of thirty-one years' standing, although the decision gives more to Muneemajra, than relative extent of territory capable of irrigation, and the claims of others, seem fairly to warrant.§ The proportions may, therefore, remain as hitherto, viz., Muneemajra two-thirds, and Puteeala one-third, it being understood, however, that Puteeala has a right to as much water as is required for the irrigation of the villages on either bank of the Koosulea and Gugur *above* the junction of the two streams, but that no separate channel is to be formed, above such junction, for the purpose of conveying a portion of the Gugur waters along the left bank of the river, previous to the division being effected, and to the consequent injury of Muneemajra. The rugged nature of the country renders any such separate cut of difficult execution, but a distinct prohibition nevertheless seems advisable.

§ The Muneemajra chief has about 20 villages, which lie within the range of the Gugur. The Puteeala Raja distributes his share of the water over from 40 to 60 villages according to the quantity, and he could irrigate about 200 if the streams were copious.

39.—II.—The Muneemajra territory lies along the right bank of the Koosulea and Gugur, commencing on the former stream nearly a mile above the junction. It is, therefore, obviously impossible to irrigate this mile of cultivation by a

rill drawn off *at* the junction, or at a lower level, and, hence, Muneemajra has by usage possessed a separate head above the junction or point of division. It is essential that this customary right be upheld, and also that the proportion of water to be so separately drawn off be defined, and this, after consultation with the Muneemajra authorities, I consider, should be fixed at one-eighth of the two-thirds. The right to a further number of heads of water is mixed up with the claim to the area of the river-bed, and they will be discussed together in the next paragraph.

40.—III.—Muneemajra had, agreeably to oral evidence and present appearances, five separate outlets or heads of water liable to occasional change of site, within moderate limits, according to the fluctuations of the river. From these five heads, fourteen separate cuts diverged at greater or shorter distances, from the banks, and some of these secondary cuts became further sub-divided into smaller channels.* Practically, of late years, water has been drawn from the Gugur, at three, or four, or five places, although, especially in our recent orders, notice has usually been taken of one point of separation only, a circumstance leading to the belief that Muneemajra, after carrying off his two-third share, had nothing further to do with the river-bed, which indeed, we have for some time regarded as belonging to neither party. As, however, the configuration of the land, and the course of petty streams from the hills, render it difficult to convey water from the point of division, selected, to some inland villages, otherwise within the range of irrigation, and as further springs arise in the river-bed to augment the assigned share, the Muneemajra chief has continued to draw fairly out of the river a portion only of his two-thirds at one recognized point of separation, and to let the remainder flow along the channel of

* The fourteen cuts were recognized by Captain Birch, thirty-two years ago. See his letter to Sir D. Ochterloney, fifth February, 1818.

the Gugur under the right bank, to receive accessions, and until he could use it most conveniently for his own purposes. Neither has the Puteeala Raja particularly objected to, or even intelligibly described, this usage* while claiming, in vague terms, the whole bed of the river as his own. The practice was also formerly recognized and enjoined by the local officers, Captain Birch and Captain Murray,† although it has latterly remained unacknowledged or been wholly forgotten by our Superintendents. Hence, I consider that this right should remain and be formally admitted, viz., that after the division of the stream, opposite Chundee, each party carry his share wholly off before it reaches the Southern limit, while the Puteeala Raja will use a portion of his share for irrigating the patches of cultivation lying above Ramgurh, and will let the remainder flow on to be increased by springs, and to be divided between himself and other claimants. This arrangement almost necessitates a division of the area of the river bed, and at the same time points out that the division be an equal one. In the Gugur there is no continuous stream of such depth as to form of itself a natural division of the sort recognized in large rivers, nor, generally speaking, are there any islands or banks thrown up in the particular portion under consideration which are worth cultivation, while the undulating nature of the shingly channel, renders it advisable that each party possess equal facilities for conveying his share of the stream down the channel. The Muneemajra share of springs will, indeed, be one-half only, instead of the two-thirds, he may speciously lay some claim to, but as no such right has hitherto been recognized by us, as an equal division is that which seems reasonable where there is no deep stream, and is

* One of many instances of customary law remaining stronger than positive enactments.

† There is a Persian order of Captain Birch's, dated 21st Sept. 1820, to the effect that the stream is to be divided at Chundee, that each party was then to remain master of his own share, and could draw it off where he pleased. Similarly there is a proceeding of Captain Murray's of 1826, saying, that Puteeala was not to allow his one-third to mingle with the Muneemajra two-thirds, thereby implying that the latter portion remained in the river bed.

moreover the simplest in cases of disputed limits, and above all as there is a recorded order of Captain Murray's making such equal division of the channel, I would recommend that the principle be upheld and declared the rule for the future*. It is not advisable that the division of the bed be marked off by pillars, for the banks are continually varying, but each party should be required to keep his share of the water, as much as possible, under his own bank by artificial means, and all formation of petty and almost profitless fields, and all establishment of permanent police posts within the channel, near cornmills, and even on islands which may not be regularly submerged, should be prohibited.† The right, however, of pasturing cattle and cutting natural grass and jungle, should be allowed to each within the limits of his own half of the river, and the cultivation of beds of sand and shingle, not forming islands, but attached to the banks, and which gradually become covered with a deposit of earth, may also be admitted. Several banks insensibly merge in the country generally, and in such case the edge of the cultivated tract should be deemed the edge of the river bed.

41.—IV.—With regard to Cornmills, Mr. Wynyard, the settlement officer, decided in 1847, (proceeding of 25th October,) that such, as either party then held, should be maintained along with any fields formed round such mills. This decision recognized the right of the Puteeala Chief to a patch of land in the bed of the river, but nearer to the Muneemajra side than to his own. The Muneemajra Chief was dissatisfied and appealed to the

* Captain Murray's order is dated, 14 July, 1825, and directs a Chuprasee to go and divide the channel half to Muneemajra and half to Puteeala.

† It is proper to mention that Mr. Wynyard, settlement officer (proceeding 5th March, 1849) and Mr. Erskine, officiating Supdt. (proceeding 16th March, 1849,) say the river bed cannot be divided, owing partly to the varying nature of the banks, and partly to the difficulty of erecting masonry pillars. The division, however, is not required for Agricultural purposes, but mainly to facilitate the flow of a stream of water, and no demarcation by pillars is necessary. In cases of dispute the line of division can always be determined by an easy measurement.

Superintendent, Colonel Mackeson, who objected* to the arrangement on the plea that the Puteeala Raja had brought the patch under cultivation in contravention of the orders of several years' repetition, which said that the river bed was not to be occupied by either party. This objection seems valid and sufficient, and as further the stream is forced by a dam from its natural course to turn the mills in question, I consider that both the mills and the cultivation should be disallowed. Finally, with regard to corn-mills, I would recommend, that each party be allowed to erect as many as he pleases, but only between the channel of his own share of the stream, and his own proper bank of the river. There will be no difficulty in this, for the mills are small, and are mostly removed annually to avoid being swept away, and the descent of the river is so great, that a very little labor can always secure an adequate fall. If the centre of the channel is kept free of fields and corn-mills, disputes will be little likely to arise, and any loss of income will be insignificant, and not to be put in comparison with the maintenance of good order.

* Colonel Mackeson, to the Govt. of India, dated 30th November, 1847.

42.—Mr. Clerk's decision of the 13th July, 1835, assigning to Muneemajra two-thirds of drift-wood and limestone, and to Puteeala one-third, proceeded on the supposition, that the river-bed was neutral ground, and had a further reference to the proportion of water enjoyed by each party. Under the proposed arrangement of an equal division of the channel, it seems but reasonable, that each should have a right to whatever is *stranded* within his own limits, and I would, accordingly, recommend that such be made the rule for the future. With regard to drifting timbers, bamboos, &c., it is advisable for the sake of preventing disputes, that neither party should be entitled to arrest or drag to the bank what is floating; such should be allowed to proceed onwards until they ground of themselves. Transported limestone will, of course, only be found at rest in the river-bed,

43.—The Jageerdar of Pubhat is a cousin of the Raja of Muneemajra, his ancestor having been the brother of the founder of the chiefship. He holds two villages, one of which, Koondee, is irrigated from one of the fourteen cuts belonging to Muneemajra, and his complaints have been frequent that, practically, he seldom received what was his right. The Muneemajra chief has urged in his defence, that he himself did not receive his proper share from the Gugur owing to the hostility of Puteeala, and that Koondee suffered in common with other villages. The right of Koondee to be irrigated has been recognized by the agents at Umbala, but only in vague terms, as that the Koondee cut was to be allowed to flow as usual. It has never been said, what proportion of the particular cut of the fourteen should be assigned to Koondee, nor what proportion of the gross two-thirds should flow in any one of the fourteen cuts, and hence, without a special inquiry, it is impossible to lay down with exactness the extent of the rights of the Pubhat Jageerdar. The question is, indeed, an internal one, and unconnected with the present investigation into the gross rights of chiefships in the whole, and it only derives a factitious local importance from the circumstance, that the Jageerdar is striving to be recognized as independent of the head of his family, and that in our well-meant support of men, relatively weak and seemingly injured, we have encouraged the natural desire of feudatories to throw off all due subordination to their principals.

44.—The next chiefship claiming the use of the Gugur, is that of *Ramgur*, lying along the left bank of the river, between the Puteeala district of Pinjor and the British "Talooka" of Mobarikpoor. The bank is from twenty to sixty feet high, and the existence of intersecting ravines renders the watering of the district generally next to impossible. The wants of the family are, therefore, limited to the irrigation of a strip of alluvial land, stretching between the high bank, and the actual channel

of the river. This strip of cultivation does not at present exceed two thousand "beegas," but changes in the river, may gradually increase it hereafter, although the present tendency is to still further narrow it. The *right* of Ramgur to any water is denied by the Puteeala Raja and also by the Chichrowlee chief, some of whose villages lie opposite to those of Ramgur, and it does not appear that the British authorities have ever given a specific decision on the subject, although there is no want of such vague orders as that, "Ramgur is to have water *as usual*," or that Ramgur, is not to form a *new* cut." The case must therefore be decided partly on the admissions of Puteeala and Chichrowlee, and partly according to the reasonableness and probable truth of the claims advanced. The Puteeala Vakeel, in a petition, filed on the 11th June, 1821, says, that the Ramgurees having always complained about water, it had been arranged, they should have enough (out of the Puteeala share,) for the irrigation of one hundred beegas. In a file of disputes between Chichrowlee and Ramgur, dated 1839 and 1845 respectively, there are admissions on the part of the former, that Ramgur first had enough water for twelve beegas, then for forty beegas, and eventually obtained a "cut." Further, the Ramgur chief rented for a time an almost waste tract on his northern boundary from the Raja of Puteeala, and the Raja seems to have allowed his tenant to draw off some water from the Gugur, within the limits of the leased tract, to irrigate, as would appear, Ramgur lands proper. The cut so formed is talked of as the *new* cut in a variety of files of disputes which may mean either simply *new* without any particular relation, or *new* with reference to an *old* Ramgur cut. At present the Puteeala and Chichrowlee authorities only admit, that Ramgur has a claim to water sufficient to irrigate a garden or orchard to the extent of a hundred beegas or forty beegas respectively. They do not, however, object to Ramgur forming cuts to drive corn-mills, for such streams can always be returned undiminished into the main channel. The Ramgur brethren

(for sub-division has been allowed to prevail, and there is no proper head to the family,) claim, on their part, as much water as will irrigate their alluvial lands and drive their corn-mills which are at present fourteen in number. They say, Ramgur had always been so irrigated, and testimony is to the effect that in imperial times such was the case.

45.—As all villages actually bordering a river, and liable to receive damage from floods, seem to have a natural right to derive some benefit from the stream, and as the more powerful neighbours of Ramgur have conceded this right to a certain extent, I think it but fair, that the little chiefship in question should be allowed as much water as will, on the average, irrigate its low lying alluvial lands. This portion need not exceed one-sixteenth of the running stream, for if the tract in question is increased by a change of channel, the addition so obtained will contain within itself, a number of springs which, added to the authorized sixteenth, will suffice for agricultural purposes. With regard to heads of water as the descent of the river-bed is considerable, and as the alluvial land is divided unequally by a projecting spit of high ground, the family should have the option of drawing off its sixteenth by means of as many as three cuts in all. With regard to corn-mills, as they do not consume water, their number need not be limited, unless the whole of the present alluvial tract is swept away. In that case, ten mills may be allowed as a limit, or five for each of the two main branches of the family, but in the mean time the brethren may be allowed to keep up their present fourteen, partly by means of the irrigation cuts, and partly by means of cuts formed for that purpose along the immediate edge of river. With regard to a division of the river-bed, and a right to increments of land, I would recommend equal division of the channel, and likewise a division of the area of islands following such separating line. Any newly formed lands which actually adjoin one bank or other, or which merge into the shore on either

side, should belong to the possessor of the bank so extended, a principle already recognized in the case of a dispute between Chichrowlee and Ramgur. The river moved a mile to the eastward some years ago, washing away lands cultivated by Ramgur, but as the tract became again raised and fit for the plough, it was occupied by Chichrowlee, as being on the right bank of the river, and the claim was admitted, although contrary to the usage of the villages lower down the stream*. As the decision, however, agrees with the arrangement recommended between Puteeala and Muneemajra, I think the principle should also be recognized as a guide between the adjoining Chichrowlee and Ramgur districts. With regard to drift-wood, &c., I consider the rule proposed for Muneemajra and Puteeala as the most applicable, viz ; that such as is actually stranded, be regarded as the property of the party owning the particular half of the channel within which the wood is left dry.

* The lands washed away were cultivated by Zumeendars of Ramgur proper, living in a separate hamlet, called Kuleeamajra, the Chichrowlee village to which the reformed fields have been attached is called Peer Mutchela. The file of the case I have not seen, but have stated it as deposed to by the two parties.

46.—The claims of the British talooka of *Mobarikpoor*, lying almost wholly on the left bank of the Gugur, may next be considered. The lands of two villages only can be irrigated from the river, viz., an alluvial tract belonging to Mobarikpoor proper, which a recent change in the channel has placed on the right bank instead of on the left, and the lands of Bunkerpoor, situated chiefly on the left bank, and now partly also on the right. The claims of the "Talooka," have been admitted from the beginning, and when the question of irrigation from the river first came before us, Captain Birch† states, that the Raja of Puteeala proposed to give the then proprietor, one-thirteenth of the stream. No notice was taken of this suggestion, but after the estate lapsed to us, it has always obtained as much water as was necessary

† Captain Birch to Sir D. Ochterlony, dated 22d Nov., 1817

for irrigation, and also for the purpose of driving two mills belonging to Mobarikpoor proper. The orders of our agents do not, however, specify what proportion of water should be enjoyed by the talooka, and that accordingly has now to be defined. In settling the point, some reference must be had to facility of division as well as to necessary wants, and I think that both objects will be met, if Mobarikpoor proper is allowed to draw off one-sixteenth for irrigation and to have a separate cut for its two mills. To Bunkerpoor, I would similarly assign a sixteenth, to be drawn off wholly from the left bank, or partly from the right and partly from the left bank according to its wants. In the case of this talooka, no order about the division of the river-bed is necessary, as the boundaries of the villages have been authoritatively marked off by the settlement or Revenue Department, independent of variations of channel. Hence, also, any drift-wood, &c., stranded within the area of the estate will belong to it alone.

47.—The Busee district of *Chichrowlee* is next met with on proceeding down the river, and, like Muneemajra, its claims have to be considered mainly with reference to those of Puteeala. The district is divided into two portions by the Gugur,—*first*, Senowlee, on the right bank, and which comprises about eight villages capable of being irrigated, and *second*, Busee proper, on the left bank, comprising twelve or fifteen villages within the influence of the river. The Senowlee portion lies south of Muneemajra, and opposite to Ramgur, and one of its compound villages, named Kukrala, is itself situated on the left bank between Ramgur and Mobarikpoor, but likewise holds lands on the present right bank of the varying channel. Further, one of the Senowlee villages called Bertana, can only be readily watered from one of the Muneemajra cuts, and it has occasionally but not regularly been so irrigated. The Busee portion proper lie opposite the Chut-Bunoor district of Puteeala within which districts, however, the Chich-

rowlee chief now holds three detached* villages as sole proprietor, agreeably to a recent arrangement regarding certain townships held jointly by the Raja of Puteeala and himself. These separate villages are on the right bank like the rest of the Bunoor district. The Chichrowlee chief has been accustomed to draw water from the Gugur for the irrigation of the Senowlee villages, but the right has rather been questioned than recognized by us excepting, perhaps, with reference to the village of Bertana above mentioned. For the irrigation of the villages of Busee proper, water has regularly been drawn off from the left bank under an old arrangement with the Puteeala Raja, while the detached villages in the Bunoor district, received a supply from the Puteeala share, so long as they were held in coparcenary tenure. The division only took place under our authority during the past year, 1849,† but the order telling off entire villages to either party, does not say how those belonging to Chichrowlee are to be irrigated. Thus the position of the different portions of the Busee district, and the absence of distinct orders on our part, both tend to complicate the extent of the right to be now decided, and the mode of distribution to be now arranged.

* Viz. Rajoomajree, Mukoondpoor and Hunsala.

† Proceedings of the Depy. Commissioner of Umbala, 9th August, 1848, confirmed by that of the acting Supdt., dated 27th Jan. 1849.

48.—The recorded orders and existing practices or arrangements bearing on the rights of the Chichrowlee chief are the following :—

I.—An injunction addressed by Sirdar Jodh Sing, in 1814, A. D., to his manager in Busee, to allow half of the Gugur waters to flow into the lands of Puteeala, and to use the other half for the irrigation of the Busee villages. The wording of this document leads to the inference, that at the time the power of the Chichrowlee chief was greater than that of the

Puteeala Raja in the particular quarter,* and Sirdar Sobha Sing, maintains, that Puteeala should only receive a half, provided his own demands could also be satisfied by a moiety. The Sirdar has also now and then affected to doubt the validity, and even the authenticity, of the order given by his father, but it has always been regarded as genuine by the British authorities, especially in an opinion given by Mr. Clerk, under date the 24th November, 1837, with reference to the objections urged by the chief. The Chichrowlee sirdar, further contends, that one-half of the stream was to be set aside for the irrigation of his villages on the left bank of the river, and that the irrigation of the Senowlee sub-division should be provided for previous to sharing the water with Puteeala, and in support of this view, he says the partition of the water between himself and Puteeala has always taken place *below* Senowlee, and *after* Senowlee had been watered by a cut, branching off several miles higher up. The Puteeala Raja contends, that the Chichrowlee chief is entitled to a half only for both divisions, *i. e.*, for the Senowlee sub-division of villages on the right bank, and for those of Busee proper, on the left bank, and he refers to Sirdar Jodh Sing's agreement, as being silent about Senowlee and as giving for the Busee district, i. e., for the whole of it a moiety only of the stream.

* The terms of the documents are in substance as follows :—"To "the manager in Busee, it is necessary, that you take half the "waters of the Gugur for your own "lands and allow half to flow "into the lands of Puteeala. Make "no difficulty about the half in "question, and do not ask for additional orders."

II.—Regarding the claim of the Chichrowlee village of Bertana to recover water from the Ubhetpoor cut, belonging to Muneemajra, there are specific orders of Mr. Clerk's on records, of dates as per margin,† which recognize the right of Chichrowlee, but on the payment to Muneemajra of seven rupees eight anas annually.

† 10th February, 1839.
10th " 1841.

III.—With regard to the separate irrigation of the Senowlee villages, out of the third of the Gugur stream, assigned

to Puteeala, in connection with Muneemajra, the orders of the British agents are on the whole adverse to the claim of the Chichrowlee chief, to draw off water previous to the equal division between himself and the Puteeala Raja. Thus under date the 7th February, 1830, Captain Murray says, that if Chichrowlee wanted to form a cut from the Gugur, opposite to the one formed by Ramgur, (*i. e.*, to water the Senowlee villages,) he should do so with the sanction of Ramgur, as Ramgur enjoyed the right through the permission of Puteeala. Again, under date the 20th November, 1840, Mr. Clerk required proof that the Senowlee villages had always enjoyed the right of irrigation and documentary or other sufficient proof does not seem to have been afforded, for there is no final decision on record.

IV.—Regarding the irrigation of the detached Chihrowlee villages in the Puteeala district of Chut-Bunoor, there are no orders on record.

49.—The custom which has practically obtained in each case appears to be as follows :—

I.—Chichrowlee has commonly drawn off nearly one-third of the minimum stream of the Gugur for the irrigation of the Senowlee villages, by means of a cut formed nearly opposite the point, where the Ramgur district adjoins the Puteeala district of Pinjor. This cut separates into several branches, and each ramification is further greatly augmented by springs arising in the deserted channels of the river, (now suited for cultivation in many spots.) So that the villages attached to Senowlee are perhaps better watered than any others near the Gugur. Further the village of Kokrala, (which is itself situated on the left bank, although its lands are chiefly on the right,) has lately established a corn-mill for its use immediately adjoining the boundary.

II.—The Senowlee village of Bertana has never regularly received water from Muneemajra, but only during a season

of abundance, and at the request of the zumeendars, rather than on the demand of the Chichrowlee Chief. The order giving water on an annual payment does not seem ever to have been acted on.

III.—An equal division of the actual stream diminished by the Senowlee, the Ramgur and the Mobarikpoor cuts, but augmented by numerous springs, has usually taken place between Chichrowlee and Puteeala at some convenient spot near the old town of Chut. Chichrowlee, however, has commonly had three heads of water, one the highest up running under the Bankeepoor village of Mobarikpoor, and supplying nominally five villages, but really more, the second, or middle cut, running under the Busee village of Pragpoora, and likewise nominally watering five villages, but really a greater number, and a third river opposite the Busee village of Brehampoora, and irrigating admittedly two villages, but, perhaps, more. Below Brehampoora the Puteeala Chief seems to have been accustomed to draw off the remainder off the surface stream (except when very copious) by means of a channel called the Raj-kool or Royal cut, which has occasionally been led so far as the gardens of Senaour, near the city of Puteeala, to the prejudice, however, of the Chief's intervening villages.

IV.—Of the detached villages of Chichrowlee, in the Bunoor district, on the right bank of the river, two, viz., Rajoomajra and Mukoondpoor, were supplied, while in co-parcenary, at the discretion of Puteeala from the Rajkool above mentioned, aided by any springs which could be led into the separate cuts, and the third, Hunsala, was supplied along with two other villages now belonging wholly to Puteeala by means of a cut branching off from the river below the head of the "Raj-kool," and fed by surplus water in abundant seasons, or partially by springs only when the whole visible stream had been turned down the main cut in question.

50.—From the two preceding paragraphs it is obvious that actual usage and recorded orders have little agreement, and the difficulty of coming to a just conclusion is increased by the circumstance that our only specific order about the Gugur, viz., the arrangement sanctioned between Puteeala and Muneemajra, takes no notice of the claims of any other party, and can, therefore, in strictness, be held decisive against the rights of Chichrowlee. That order, however, should in fairness be held to refer to the particular case then before the authorities, and to have been given without due reference to the existing rights of others, or to the actual circumstances of the river, which is increased by springs below Muneemajra. Hence all things considered, whether usage, orders, agreements, or quantity of land having a reasonable claim to irrigation, I am of opinion :—

I.—That one-half of the stream below Muneemajra should be assigned to Chichrowlee, exclusive of the Ramgur and Mobarikpoor deductions.

II.—Of this half Sirdar Sobha Sing may take a fourth (or an eighth of the whole,) by means of one cut for the irrigation of the Senowlee portion of his villages naturally well provided with springs, and

III.—The remaining three-fourths of the half, (or three-eighths of the whole) by means of two equal cuts for the villages near Busee itself. For the latter batch of villages he has, at present, three heads of water; but as the smallest is in a detached piece of land on the left bank of the river belonging to Puteeala, and as a little labor and management will make two main heads sufficient, I think the third should be disallowed to facilitate division of the stream, and to diminish the chance of disputes.

IV.—The village of Kukrala attached to Senowlee, but situated on the left bank, has not above ten or twelve beegas

of land on that side capable of being irrigated, and hence I do not think that the difficult matter of dividing the stream should be further complicated by assigning to it a fractionally small head of water, but the mill, which it has recently established, should be allowed to be maintained as that causes no wastage.

V.—With regard to the claims of Bertana to water from Muneemajra, I see no manner of admitting the right, which may not be made a fertile cause of dispute; to do so would require an order laying down what proportion of the ever-varying two-thirds, Muneemajra is to admit into a particular cut supplying several villages; and, again, what proportion of the contents of the said cut is to be assigned to the one Chichrowlee village? Hence as the right has a price attached to it of seven and half rupees a year, it seems advisable for the sake of good order to abolish it so far as our guarantee is concerned; but the zumeendars or the Chief may be allowed to make their own arrangements with Muneemajra, renewable year by year,* or with our cognizance, such an exchange of villages may be effected as will admit of either party irrigating his new township from his own proper water-cut.

* An engagement of the kind should be limited to one season, for if it extends over many year, our position as paramount, and, therefore, as final adjudicators, renders our liabilities naturally equivalent to a formal guarantee.

VI.—The claim of the three detached villages in Bunoor has similar difficulties to be considered, and with regard to their irrigation, I would recommend as follows:—The Puteeala Raja to have the option of throwing the whole of the stream, remaining after all authorized deductions have been made, into his "Raj-kool," or great cut for the use of his own villages, but the half of any surplus which he may allow to escape, or the half of any stream created lower down by means of springs or percolation, to be at the disposal of the Chichrowlee chief, for the one purpose of irrigating his detached villages in question, so far as he can do so by means of separate cuts, leading from the river to the villages, without

passing through the area of a Puteeala village. Otherwise, the Zumeendars or the chief may be allowed to make their own arrangements for one year at a time, with the Raja of Puteeala, for a supply of water for the " Raj-kool," but it is expedient, that we avoid guaranteeing any thing, for as there are many more villages in the Bunoor and adjoining districts than can be irrigated from the final share of the Gugur stream, the Raja may always break with the Chichrowlee chief on the plea, that water is scarce, or that it is wanted for other villages than those adjoining the townships of Sirdar Sobha Sing. The most complete arrangement, however, would be to cause an exchange of villages between the two chiefs. The Lalroo district of Puteeala, lies immediately to the South of, and on the same side of the river as, the main portion of the Busee district, and a transfer of adjoining townships would further simplify police arrangements. The villages to be received by Chichrowlee should somewhat exceed in value, those to be given by the chief, for the Lalroo district cannot be irrigated, and the produce of lands is consequently more fluctuating than where water is even occasionally only at command.

VII.—With regard to property in the river-bed, as the limits of the Busee and the Chut-Bunoor districts have been marked off by the settlement of revenue department, independent of the stream, the right to the whole channel will obtain where either land on both banks, or to half only where each possesses simply one bank.

VIII.—The claim to drift-wood, &c. will, naturally follow the property in the ground, which receives such as may be stranded.

51.—The principal rights of the Raja of *Puteeala* have been defined in laying down those of his neighbours; but for the sake

of completeness, I will repeat them with the addition of such points as may have been omitted, and of such as concern other districts than those already included in this Section :—

I.—The Raja is to be entitled to the free use of the Gugur and Koosuleea streams above their confluence for the irrigation of such villages as are likewise situated at or higher up than the junction. Not much water will be consumed in this way, for the lands in question are mere strips, lying along the banks of either river at the foot of high banks or higher hills.

II.—At or near the confluence of the two rivers the joint stream is to be divided in the proportion of two-thirds to Muneemajra, and one-third to Puteeala. The Muneemajra share is to be inclusive of one-eighth of that share, or one-twelfth of the whole previously withdrawn for the irrigation of such lands as lie above the junction. After the separation of the stream into two portions, the Raja of Puteeala is to keep his share running as much as possible under the left bank, while the Muneemajra Chief will keep his under the right, and this arrangement is to be effected by art if necessary.

III.—The Raja is to have the free use of this third portion for the irrigation of such villages as belong to him on the left bank of the Gugur below the junction of the Koosuleea, and as far as the Ramgur boundary.

IV.—The Raja may establish as many corn mills as he pleases below the junction, and as far as Ramgur boundary, but only between the actual course of his one-third share and the left bank of the river.

V.—The actual area of the beds of the Gugur and Koosuleea to be divided half-and-half between Puteeala and Mu-

neemajra, where each holds a bank. No cultivation is to take place within the channel, but cattle may be grazed, and grass and jungle wood may be cut by each within his own limits.

VI.—Drift-wood, &c., which may be stranded, and transported limestone, which may be lodged within the half area belonging to Puteeala, to be the Raja's sole property.

VII.—Of the one-third of the stream assigned to Puteeala, the Raja may take such as is necessary for watering his villages, which lie opposite to Muneemajra, as has already been said. Of the remainder the Chichrowlee Chief may take one-fourth for his Senowlee villages. Of this second remainder, the Ramgur brethren may take one-sixteenth for their lands. Of this third remainder, the Mobarikpoor villages are entitled to one-eighth, and of the fourth remainder, (each remainder being, however, intermediately increased by springs,) the Chichrowlee Chief is entitled to three-eighths. The fifth remainder of five-eighths to be at the disposal of the Chief of Puteeala for the irrigation of his Chut-Bunoor and other districts on the right bank, the same being drawn off into one cut, called the Raj-kool, by means of one dam.

VIII.—Half of the river-bed will belong to Puteeala, where the Raja holds one bank, and the whole where both banks are his.

IX.—The right to drift-wood stranded will follow the proprietorship of channel.

X.—Any water which the Chief of Puteeala may allow to escape from the Raj-kool dam, or any stream formed below the dam by percolation, or by springs, to be shared equally, if necessary, with the Chichrowlee Chief, for the irrigation on the part of Sirdar Sobha Sing, of such detached villages as he possesses in the Bunoor district.

XI.—Any stream remaining after all the above deductions have been made, to be the sole property of Puteeala, so far as regards dry-season irrigation, and the Raja may continue to draw such surplus stream off from the right bank as he now does by means of the cuts known as those of Murdanpoor and Tepla, excepting that the villagers of the Umbala district, residing on or near the river, are preferentially to have the right of watering their cattle by means of pools or dams sufficient for that purpose, so long as water is obtained by excavating or embanking in accordance with the decisions of Mr. Clerk, the Political Agent, dated the 6th and 15th May, 1837.

52.—For facility of reference a bare synopsis of these proposed arrangements, without any explanatory detail, is separately given in Appendix F.

53.—The relative rights of the different claimants to the cold and warm season waters of the Gugur having been determined, the mode of dividing the actual stream, and of rendering the proposed arrangements effective, remains to be considered. This latter part, if the question is of as much importance to the interest of the parties concerned as the former, and it likewise behoves the British Government, as the paramount power, and as the common protector of all, to see that its own orders are properly carried out, and that its judgments, in favor of the weak and the honest, are not infringed by the power and dexterity of the strong and unscrupulous. Without, indeed, our continued Superintendence and mediation, the most judicious scheme must soon become inoperative, and the disputes, complaints, and vague orders of the last forty years would speedily recommence in spite of injunctions and exhortations. In a matter of lively interest and complicated detail, it is in vain to expect forbearance and unanimity among men jealous of one another, and still prone to resort to force to secure a present advantage, or to gratify an old revenge. We alone can preserve order and arbitrate authorita-

tively, and I consider the appointment of a responsible native officer to the special duty as essential to the completion and permanence of any decision now given. When the interests of many villages are concerned, the chiefs themselves find the nomination of such a functionary necessary for the sake of good order, and both reason and example render it incumbent on us to adopt a similar precaution. This "Darogah of the Upper Gugur" may conveniently reside at Mobarikpoor; he should have had some previous experience in dividing off water on the Jumna Canals, and his expectations of advancement in the Government service should not be affected by his detached employ. His salary should, perhaps, be sixty rupees a month, with ten rupees for horse allowance and stationery, and ten rupees additional for two hurkarus. The total of eighty rupees may be charged to the different districts according to the following rates, in which means, as well as benefits received, have been considered. Puteeala, $\frac{6}{16}$ or thirty rupees, Muneemajra, $\frac{4}{16}$, or twenty rupees, Chichrowlee, $\frac{4}{16}$ or twenty rupees, Ramgur, $\frac{1}{16}$, or five rupees, Mobarikpoor, $\frac{1}{16}$, or five rupees, total $\frac{16}{16}$ at five each share, or eighty rupees in all.

54.—The actual division of the stream between Muneemajra and Puteeala, used occasionally to be effected by the deputation of an "Ameen," or a "Chuprasee," on the part of the British authorities, who roughly estimated the volume of water in length, by hands, and in depth by fingers, and so made a partition which sufficed. Lately Colonel Mackeson, proposed * that Muneemajra should draw off the whole stream for two days, and Puteeala for, one, and this common practice in fields and gardens might be advantageously adopted, were the stream as readily turned in the broad and strong bed of the Gugur as in a narrow trench, and were there no other parties concerned besides Puteeala and Muneemajra. The dams, however which are necessary to cause the water to flow into the heads of the cuts require, notwithstanding their insignificant height

* Lieut.-Colonel Mackeson, to Secy., Board of Administration, Lahor, dated 29th December, 1849.

*some* art and labor, to render them durable, and to guard against excessive leakage, for the materials most available are, high up, shingle, gravel and bushes, and low down mere sand. The constant breaking and reclosing of dams of this sort would be troublesome, and would further prove a source of dispute, while the alternate flow and stoppage of the stream would greatly complicate the division of the water lower down, and, perhaps, render an *equable* division impossible. For this latter reason alone it is, therefore necessary, that the Puteeala one-third share be allowed to flow uninterruptedly. A simple, and at the same time, an accurate and efficient mode of dividing the water in given proportions, is by means of boards of different lengths, but of a uniform height or breadth, and containing rectangular openings of fixed dimensions and capable of being closed by slides. These may be inserted in the dams, and a passage given to the water through as many openings as may be necessary according to the relative rights of the parties. Even this degree of assistance may not be necessary in all cases, for the fact of our ever present superintendence, and mediation will gradually remove irritation and jealousy, and, in a short time, each claimant may be satisfied with the proportion assigned to him by estimates in the presence of his own people, by a conciliatory and experienced servant of the British Government.

## *VIII.—Proposals regarding the uses of the waters of the Gugur and Sursootee during the wet season.*

55.—The present method of throwing dams across the Gugur and Sursootee, for the purpose of securing the local use of floods, has been condemned as wasteful and unfair by the observations of scientific, and by the experience of Administrative Officers. It is, moreover, self-evident that the rude unsystematic labors of villagers can never effect the economical and impartial distribution of a limited and uncertain supply of water, but after what has already been said on the subject in the third and sixth

sections of this Report, it is needless to enter into a further statement of reasons in detail.* While objecting, however, to present modes, it has been at the same time admitted that a partial employment of dams under proper regulation is necessary to a full use of the waters of the rivers† although it has also sometimes been thought, that irrigation could be adequately but more expensively, effected by means of small branch canals.‡ A combination of the two views or modes, viz., a limited use both of temporary and permanent dams, with an increased recourse to enlarged and well-planned side-cuts or canals, will doubtless give such a degree of command over the rivers as is necessary to a fair and effective division of their waters among the numerous villages which can be brought within the influence of their floods. To determine, however, the exact sites for dams and the best lines for canals together, with the details of construction suitable for each, is not possible until the rivers and adjacent country have been surveyed and levelled with that object in view, and until both have further been inspected by a qualified Officer under the varying phases of the cold, the dry, and the rainy seasons. Neither can definite proportions of the annual floods be assigned to different claimants, owing to the total want of specific orders on the subject proceeding even on assumed data, and to the fact of our present ignorance of the capacity of the rivers, and of the extent of land in each Chiefship or district, which can readily be flooded or irrigated. The following paragraphs will, therefore, only contain such approximate views as have suggested themselves on applying admitted general principles to an imperfect knowledge of particulars. The recommendations, it may be ad-

* Col. Colvin, in his report of 1832, on the Delhi canals, and his letter to the Sudur Board of Revenue, N. W. P., 1st August, 1836.

Col. Cheape, in his letter to the Military Board, dated 27th March, 1840.

Major Baker, in his report to Superintending Engineer, N. W. P., dated 17th September, 1841.

The office of the Umbala Supdcy. contains numerous complaints about, and numerous orders to, destroy dams.

† Col. Cheape and Major Baker, as quoted in the preceding note.

‡ Col. Colvin, in his report of 1832, and likewise the agent at Delhi to Mr. Clerk, dated 20th August, 1838.

ded, will proceed on the equitable basis of giving something to every one dwelling on the banks of the rivers as far as the streams can readily be made to reach for, as all parties are liable to receive more or less injury from continued floods, and those low down must aid those higher up by allowing free way to an excess of waters; it is but reasonable that all should share in the benefits desirable from the rivers under ordinary circumstances.

56.—The character of the *Gugur* is such that it is not necessary, nor easily practicable, to commence a regular system of dams before reaching the neighbourhood of *Márao*, lying South-West from Umbala, and at a distance of forty miles from the hills, but :—

I.—Near that place, the Raja of Puteeala should be allowed to erect, for his own use, a masonry dam with ample sluices, for the purpose of throwing the waters of the river to the right and left along the skirts of the natural hollow, extending for ten miles towards Boonerheree.

II.—Near Doordh-Mehmoodpoor, again, opposite Arnowlee, a second permanent dam may be built for the purpose of irrigating such lands belonging to Kaeethul, Arnowlee, and Puteeala, as stretch along the river to the South-West of the basin already described, previous to the ridge or swell of Krahul and Badshapoor being reached.

III.—Near Krahul, or below the junction of the Tangra and other Umbala streams, the intention of Bhaee Lal Sing, of Kaeethul, may be carried out by erecting a permanent dam for the irrigation of the numerous villages of that district lying principally to the South of the river.

IV.—At Badshapoor, where tradition represents Akbar to have built a dam surmounted by a bridge, and where Alha

Sing, the first Puteeala chief, succeeded in maintaining an earthen embankment for a few years, a fourth permanent dam may advantageously be erected, as by its means a considerable number of Puteeala villages can be irrigated.

V.—The site selected by Colonel Cheape and Major Baker, for a masonry dam to regulate the supply of water in the two branches of the Gugur traversing the Hisar and Sirsa district is at Phoolud, near Moonuk, in the Puteeala territory. The locality, however, of the bifurcation requires that this British work should be beyond the British boundary.

57.—These five masonry dams seem all that are essential, although on further enquiry it may prove advantageous, bearing in mind, however, the claims of Beekaneer, to erect two or three others, especially in the Hureeana and Bhuteeana districts, within which the Gugur has a course of about ninety miles. As a general rule, the dams should be lower than the banks of the river, so that a greater or lesser portion of most freshes and floods may find a way down the ordinary channel, and they should further be constructed with sluices at proper intervals, but as wide as possible and reaching to the bottom, so that after the dam has been used to throw the water of some one fresh into the canals branching from it, the gates may be opened to give succeeding floods free way, and to prevent the bed being raised.

58.—The assignment, as it were, of particular freshes to particular districts, must depend on further enquiry, or even on the experience of years. The number of floods is uncertain, and each party is, therefore, anxious to secure the use of the early inundations. It seems but equitable that the tracts receiving least rain should have the first use of the river, and on this principle the Raja of Beekaneer has a priority of claim, but it is more than probable, that the *first* flood would not reach his boundary, for the distance is great, and the whole of the river might be

consumed in the thirsty soil of the low level between Maroo and Boonerheree, and in the two shallow depressions which form its channels in Hureeana. Practically it may, therefore, be advisable to assign the first fresh to the Raja of Puteeala, to be partly turned aside at Maroo, and partly allowed to saturate the hollow to the South-West of that place. Or as the floods cannot be depended on in number or copiousness, it may be necessary so to construct the Maroo dam, that the same fresh answers both for it and for the dam at Doordh-Mehmoodpoor. * The second fresh may be assigned to Hisar and Sirsa by means of the Phoolud dam. The third may become the right of Kaeethul and Puteeala jointly by means of the Krahul and Badshapoor dams. The fourth should be allowed to flow uninterruptedly into Beekaneer, benefitting intermediately such lands as can be watered without recourse to dams, or even, perhaps to simple cuts. To the fifth flood, when such may occur, Hisar and Sirsa have the best claim, and to the rare benefit of a sixth, the adjoining districts of Kaeethul and Puteeala are reasonably entitled.

* The common property of Kaeethul, Arnowlee and Puteeala.

59.—The sizes and courses of the principal canals, and the numbers and dimensions of their branches, will depend on the quantity of water which can be spared on the extent of land to be irrigated, and also on the configuration of the ground; and, hence, nothing can, at present, be said about the details of these works. It also remains for future enquiry to determine whether the entrances to the canals should be sluiced masonry dams, or temporary earthen works, and whether they should be closed or not, when the adjoining river dams are opened to allow the waters a free passage. As, however, the arrangements, which it is now desired to make, should be as efficient as possible, both as regards command over the stream, and the avoidance of disputes, there should be little hesitation in preferring an extensive employment of masonry works.

60.—Besides the permanent works above described, a limited resort to temporary earthen dams may also be allowed. Thus, in the hollow between Maroo and Boonerheree, the Puteeala Chief may find it advantageous to use them in throwing the waters of the first fresh (assigned to him suppositiously,) into the cuts leading to the large village of Musinghan and to the town of Ghoran, that is, should it not be found preferable to irrigate these lands by means of the canal branching off from the Gugur above Maroo. Under any circumstances the right of the Raja to irrigate these principal places should be maintained, especially as the superfluous water finds its way into the Gugur a few miles lower down. Similarly the Kaeethul and Puteeala villages may be allowed to throw up earthen dams in the branches and old beds of the Gugur, (but nowhere in the main channel) between Arnowlee and Moonuk, and the inhabitants of Hureeana and Bhuteeana should be permitted to disperse the waters of the freshes assigned solely to them by means of such temporary works, on the carefully-observed condition that they are levelled in sufficient time to allow the flood allotted to Beekaneer to find its way without loss or interruption.

61.—The valley of the *Soorsutee* appears to have a smaller descent than that of the Gugur, and its volume of water is also much inferior, so that the works to be erected on it will be comparatively small. The character of the basin is that of a uniform flat, a circumstance which renders the proper sites for dams less obvious, on a cursory inspection, than inthe case of the other river, and hence an accurate survey may render necessary a wide departure from the present recommendation. It seems, however, advantageous to have :—

I.—A dam below the junction of the Chitung, the volume of which stream may be artificially increased as of old by again diverting the feeders of the Markunda.

II.—The separation of the Chitung and Sursootee near Ladwa, is another good place for the erection of a dam, as by means of the former stream, the dry lands between Thanesur and Kurnal may be laid under water. One of the branches of the flooded Chitung may properly be made the feeder of the great tank at Thanesur, in fulfilment of the intention of the Sikh Chief who first acquired the place, and to whose rights we have succeeded.

III.—A third dam may be erected below Thanesur and near Bohur to water the lands stretching on either side towards the junction of the Markunda.

IV.—The fourth dam will be a modification of that at Pehoa,* required to fill the hollow surrounding Kaeethul town, and to irrigate the intermediate villages. This work will be the largest on the Sursootee as the stream has to be thrown fairly out of its natural basin.

V.—A fifth dam may be necessary near Polur, where the remains of an old imperial bridge are still to be seen, and the canals leading from which will water a few Puteeala villages, including Ber Jhuk, as well as those of Kaeethul.

VI.—Below Ber Jhuk, the sixth and last dam may be erected, so as to irrigate the Puteeala and Kaeethul lands lying towards the Gugur.

* The enlarged dam erected at this place in 1836, by the late Chief of Kaeethul, in contravention of the rules laid down by ourselves is still maintained since the lapse of the territory, although we thereby lay ourselves open to the charge of a selfish disregard of orders which we make others obey. Further, on the 20th July, 1844, Major Leech, then in charge of the district, directed the dam to be destroyed but piecemeal and not at once, for fear of damage from a rush of water, an injunction which seems to have been subsequently understood to mean a *partial* destruction only (Deputy Commissioner, Kaeethul, to Commissioner, Cis-Sutlej, 24th August, 1849.)

62.—By means of the upper dams and the stream thrown down the Chitung various petty chiefships will benefit,* as well as the British districts of Ladwa, Thanesur, and Kaeethul, and, perhaps, a portion of Paneeput. Careful surveys and further enquiry may also show the practicability and the justice of throwing the whole of the ordinary floods of the Sursootee proper, over the lands between the junction of the Chitung and the mouth of the Markunda, and of trusting the supply of Kaeethul, and of the villages between Pehoa and the Gugur, to the larger stream of the Markunda. At present mere surmises can be made, and neither is it possible to recommend any particular order for the use of the successive floods, especially as along the Sursootee irrigation may almost prove of more value in nourishing autumn crops of rice, than in preparing the ground for winter crops of wheat and pulse. Of the Markunda, the second, if not the first, copious flood may properly be thrown almost wholly towards Kaeethul town.

* As Chichrowlee, Moostufabad, Sekundra and Shahabad, &c., &c., on the Sursootee, and Beirsal, Seekree, Shamsgurh, &c., on the Chitung.

63.—In the main channel of the Sursootee, either before or after its junction with the Markunda, there does not appear to be any necessity for the erection of temporary dams, although in such branches as are naturally filled, and the artificial cuts or canals, such may be erected to aid in an efficient distribution of water among the claimant villages.

64.—After means have been devised for making a fair distribution and economical use of the waters of the Gugur and Sursootee, the necessity will be more apparent than at present of guarding against the distructive effects of late or untimely floods. The valley of the Sursootee is every where flat, and is throughout liable to be thrown under water by ordinary freshes. The Maroo and Boonerheree depression of the Gugur, and the broad and shallow course of the united streams in Hureeana, are likewise subject to inundation.

Hence scarcely a season passes without the rice crops of the rains, and the corn and pulse crops of the cold weather being more or less seriously injured by an undesired rush of water. This was particularly the case during the spring of the present year, and the general fact has been noticed by Major Brown, Revenue Surveyor, and Mr. Vans Agnew, formerly in charge of Sirsa.* The proper remedy for this evil is to embank the rivers, so as to confine the floods within limits. These embankments should not, however, follow the petty irregularities of the channels. They should rather be formed nearly parallel to one another, stretching almost in a straight line from salient to salient, so as fairly to include every winding between them. By this means the floods will have free way in a broad belt, eight or ten times the width of the simple channel, and the beds of the rivers will only be sensibly effected at the end of long periods of time. Such is undoubtedly the true method of embanking all rivers subject to flood, nor is it necessary to allow the rich lands between the dikes to remain uncultivated. The two main lines of embankments should, indeed, be high enough to retain the greatest inundations, but in the case of large rivers especially, the lands within bends may have inferior embankments, liable to be overtopped or destroyed by excessive floods, but sufficient to protect the included crops on ordinary occasions. The Gugur, where affected by the present proposition and the Sursootee throughout, have windings too small to render a set of secondary dikes necessary, and the only point to be considered is, whether the benefits derivable would more than compensate for the expense to be incurred. This—surveys, levels, and further enquiry can alone determine.*

* In their reports, dated respectively the 4th July, 1840, and 27th October, 1844. The one addressed to the Rev. Board, N. W. P., and the other to the Commissioner of Dehli.

* Major Baker in his Report of the 17th Sept., 1841, para. 15, has touched on the subject of side embankments. He sees advantages, but thinks the cost would be considerable, and that the beds of the rivers would be raised injuriously, as doubtless they would, were the embankments tamely to follow every tortuosity of the channel.

65.—A proper decision cannot be formed regarding the uses of the rainy season waters of the rivers, until detailed topographical, and levelling surveys have been made, and until the character of the streams have been carefully observed during at least twelve consecutive months, and more especially during the period of floods. The claims of different parties, founded on old custom to the use of more or less water, should be taken into consideration, as well as financial expediency and engineering facilities and difficulties. Hence the appointment of an officer of tact and experience is essential, and he should further have the aid of an establishment sufficient to enable him to complete the surveys, and to note the spread and the rise of inundations within a definite time, as a year, or what would be better within two years. The expense of this preliminary enquiry may be borne by the British Government in the proportion of three-fourths, and by the Raja of Puteeala in the proportion of one-fourth, but after it has been determined what works should be constructed, and what benefits the Government, or each chief, or proprietor, will receive, the original cost of dams, canals and embankments, and also the expence of annual repairs, may be equitably divided among all who derive advantages from the rivers touching or traversing their lands. It is almost needless to add that a permanent establishment will be necessary to look after the works, and to see that the dams are opened and shut according to rules, having the common good in view.

66.—In case reasons of any kind should render it expedient to postpone the preliminary enquiry spoken of, the employment of temporary dams on the *Gugur* may be allowed in the meantime, as follows :—

I.—At Maroo, by the Raja of Puteeala, for the first flood in part, and

II.—At Doordh-Mehmoodpoor by Puteeala, Kaeethul and Arnowlee, jointly, for the remainder of the first flood.

III.—At Krahul by Kaeethul, and

IV.—At Badshahpoor by Puteeala for the third flood, if it be worth while to erect such expensive works year by year.

V.—The second flood should be the property of Hisar and Sirsa, under such regulations as the local officers may determine.

VI.—The fourth flood, or the third, if not otherwise used, should be allowed to flow into Beekaneer, and

VII.—The fifth (or fourth) flood, if any, may be allowed to be arrested by Puteeala, Kaeethul and Arnowlee, by means of the re-constructed dams of Maroo and Doordh-Mehmoodpoor. With respect to the *Sursootee*, the only large dam, which need be allowed for the present, is the one at Pehoa, and that solely to throw the second flood of the season towards Kaeethul, after which it should be broken down or a separate passage opened. The numerous petty dams, already in existence, may remain subject to the regulation of the local officers, but on condition that bordering chiefships, especially Puteeala, towards the mouth of the river, receive a fair share of water along with the British districts. As the portion of the course of the Sursootee under consideration, lies mostly, if not wholly, within the Deputy Commissionership of Kaeethul, the arrangement will be attended with comparatively few difficulties.

## *IX.—On increasing the flow of water in the Gugur and Sursootee during the wet season.*

67.—The streams of the Gugur and Sursootee are small and precarious, and quite unequal to the proper irrigation of the arid tracts of their lower courses, yet the soil of the Sikh States

and of the Hureeana districts is naturally good, and only requires water to enable it to produce luxuriant crops of grain. Hence some of the officers, whose attention has been directed to the subject of these rivers, have been led to consider how their volumes might be increased, and the present is a fitting opportunity for again bringing their proposals to notice. Major Baker and Major Brown* looked to the Sutlej as a source of supply, but the waters of that river may, perhaps, be more profitably employed in diffusing fertility over the dry lands between its own course, and that of the Gugur, while the greatness of the expence which must be incurred, places the entertainment of the project beside the scope of the present enquiry.† Another scheme is to throw the waters of the western Jumna Canal into the Sursootee during the rainy season, when, from necessity or custom, little or no use, seems to be made, of that work for purposes of irrigation. The idea appears to have originated with Lieutenant R. Strachey of the Engineers, who was sent to examine the Gugur about ten years ago, and the suggestion is one which reflects credit upon an officer of his then short standing and slight experience.‡ The advantage of the measure would be great, immediate, and lasting, and both its practicability and its value are attested by the competent judgment of Major Baker, although, his prudence induces him to allude to some unspecified attendant difficulties.§ The canal and the Sursootee are only from five to eight miles apart in their upper courses, and as the most favorable

* See Major Baker's report of the 17th Sept., 1841, para. 6, for Major Brown's views, and para. 44, and also his separate report of 24th Sept., 1841, for his own proposals. Both papers are included in the printed reports on Projected Canals, Dehli Territory.

† Major Baker's letter to the Military Board, of 27th May, 1847, on the subject of irrigating the tracts south of the Sutlej, shows that the topography of the country is such as would involve a greater outlay than was at first thought. Selections from Public Correspondence N. W. Provinces, Part VII.

‡ Major Baker's report, of 17th September, 1841, para. 43. Lieut. R. Strachey had, however, probably heard of Major Durand's plan of 1837-38, for improving the irrigation from the Nujufgur lakes by means of an escape from the canal.

§ Major Baker's report of 17th Sept., 1841, para. 43, and

his memoranda on the Jumna Canals, —London, 1849, page 76.

point for branching off is above the Dadoopoor dam, or above where the wholly artificial canal begins, the supply of water need not be limited by the size of that work, which would, indeed, remain unaffected, by this diversion of part of the copious flood of the Jumna. A sluiced dam would be necessary at the head of the outlet to shut out the dry-season stream of the river, which is wanted to feed the Doab and the Dehli canal, and the cut to be formed from the Jumna to the Sursootee, may require some regulation as to a continuous fall or as to a descent by steps. A greater or lesser portion of the upper course of the Sursootee, may have to be embanked in the manner described in para. 64, so as to avoid the injurious submerging of productive lands, and it may be found advantageous to erect a sluiced masonry dam where the Chitung separates from the Sursootee, to regulate the supply of water in the former river, and to guard against a perhaps detrimental flooding of the Hansee canal, where the Chitung, when doubly swollen, by the cut from the Jumna and continued rain, to be left uncontrolled. All these works would be simple and inexpensive, while the uninterrupted flow for four months, of a large body of water, would cover the whole valley of the Sursootee with a rice crop during the rains, and besides giving the people of Hureeana and Beekaneer, a more copious supply than has been poured into their country for ages, or than could be derived from any destruction of Sikh dams, the means would be afforded of extending the irrigation of the southern portions of the Kaeethul district, not only by filling the Chitung, but by enlarging the cut, leading from Pehoa, and perhaps by means of other branches. The scheme has thus, in the present state of our knowledge, the unusual recommendations of simplicity of construction, cheapness of outlay, and largeness of profit, and it is one which may advantageously be brought to the immediate test of enquiry and estimate.*

* As a further proof of the feasibility of the scheme it may be mentioned, that Major Baker states, that in 1843, Sir George Clerk,

then Agent on the N. W. Frontier, suggested the formation of a cut from the Canal into the Chitung, for irrigating the eastern portions of the newly acquired district of Kaeethul. The estimated expence of the work was 1,60,000 Rupees, and the calculated gross returns 54,000 Rs. a year. Memoranda on the Jumna Canals, London, 1849, pages 75-76.

68.—Another project for swelling the stream of the Gugur is, that of throwing the Ghiree into it within the hills. The Ghiree rises to the north of Simla, and is a principal feeder of the Jumna. A single ridge separates its valley from the sources of the Gugur, and the peasantry of the country seem always to have thought that the bed of the one river was sufficiently high and the bounding ridge sufficiently low, to admit of the easy transfer of its waters into the channel of the other. No examination of the range of hills has as yet been made by a qualified person, but the scheme is one talked of by those who have occasion to lament the slenderness of the stream of the Gugur, and the Raja of Puteeala is intent upon it, in the hope, that he may be allowed to draw off the whole of the Ghiree for the irrigation of the country between Chut-Bunoor and his capital town during the dry season. On this condition, the Raja is ready to bear the whole charge, as he is to contribute to the expense of augmenting the Gugur in any way during the whole or the part of each year. The question is one, which may, with propriety, be inquired into, in connection with the irrigation of the Cis-Sutlej States, and perhaps a simple inspection of the tract, by an experienced Officer, would enable him to say, whether it were worth while to make a regular survey or not. Besides the economical feasibility or advantage of the measure, the points to be determined are, whether the whole or a portion of the Ghiree can be drawn off during the *dry* season without prejudice to the two canals of the Jumna, and what is the least quantity of water which can be thrown into the Gugur during the warm months, without being liable to great diminution or total absorption in its shingly bed. During the rainy season, the whole of the upper Ghiree may doubtless be used to the great benefit of the lands on either

bank of the central Gugur, and without sensibly diminishing the Jumna or affecting its navegation in any way.

## *X.—The Remarks about Dams, &c., applicable to Rivers in the Cis-Sutlej States not yet examined, as well to the Gugur and Sursootee.*

69.—The instructions which I received, embraced an examination of the Gugur and Sursootee only, but the other streams of the Cis-Sutlej States are also employed for purposes of irrigation, and as the greater number of them either actually reach, or flow towards the line of the Gugur, they should perhaps all have been included in the present enquiry. The Markunda especially is an important river and second to the Gugur only in size, although its geographical distinction is lost in the superior fame of the Sursootee, which it joins and more than doubles in volume. The other principal streams proceeding from the westward are:—*1st*, the Sisoo, which flows into the Sutlej; *2nd*, the Sirhind, and *3rd*, the Puteeala rivers, both rising beyond the limits of the Puteeala territory; *4th*, the Tangree, and *5th*, the Bulcealee, passing near to Umbala; *6th*, the Chitung; *7th*, the Raksee, and *8th*, the Somb, which joins the Jumna. There are others, however, which benefit agriculture, and about the use of which there are occasional disputes, and it is evident that the right to draw off their waters, and the times and mode of doing so, should all be ascertained, methodized and recorded. The necessity of thus regulating, rather than needlessly meddling with, the use of these streams is undoubted, for it is notorious that, at present, and perhaps for generations, they have been arbitrarily diverted by petty chiefs and heads of villages as opportunity offered, for their own immediate benefit, but to the general injury of the country, which has been cut up by the sandy channels of torrents, perpetually striking out new courses for themselves, owing to the existence of the unremoved dam of one village

or the unclosed irrigation cut of another. A mediation of the kind seems, indeed, as necessary to the maintenance of order, and to the equitable assessment and regular collection of revenue, as the demarcation of village boundaries and the registry of lands under the plough. The waters of all rivers should, perhaps, be allowed free way in the wet season, for under the hills, a deficiency of rain is of rare occurrence, and the soil scarcely needs artificial saturation.

## *Conclusion.*

70.—The views entertained of the practicability of greatly increasing the body of water in the Gugur and Sursootee, to the benefit of every district traversed, and the necessity which exists for regulating the irrigation of all the rivers of the Cis-Sutlej States, as well as of the two-named, give additional force to the recommendation made in para. 65, that the whole question be further inquired into by a competent officer, aided by an adequate establishment. Without proper topographical and levelling surveys, and without a careful personal observation of the channels and inundations of the rivers, the numerous questions of contested rights, which have needlessly added to the duties of local officers, during the last forty years, will continue to be brought forward, and the Government will never be aware of the extent to which the province is capable of improvement, and never be able to decide on the combined economical and scientific feasibility of works which are almost periodically pressed upon its attention by the praiseworthy zeal of its servants.

I have, &c.,

(Signed) J. D. CUNNINGHAM,

*Capt., Engineers,*
*On special employ, Cis-Sutlej States.*

*Simla, 25th July*, 1850.

# APPENDICES.

## APPENDIX A.

### *Decrease of moisture in the Sirhind province.*

Englishmen, generally, who have an acquiantance with these parts, attribute the falling off in the rivers to a decrease of humidity or of vegetation, either phenomenon leading to the other. Colonel Colvin gives the *present* system of damming the rivers in the Sikh States, as the main source of the diminution of their streams, (Report of 1832, on the Dehli Canals,) but he does not say that in former times, dams were unknown or disallowed. Major Brown, however, shows, (Report of 1841, para. 13,) that prevailing winds from the west cause the desert to advance on the grass lands of Hureeana, and therefore to increase both absorption and evaporation, or in other words to produce dryness, while Major Baker, (Report of 1841, para. 15,) says, the constantly increasing accumulations of alluvium at the base of the mountains, absorb more and more of the waters of the rivers on quitting the hills, and so diminish their volume lower down. The cause assigned by Major Brown seems the most efficient and comprehensive of those mentioned, but all are doubtless in joint operation.

## APPENDIX B.

### *Course of the Gugur towards the Sutlej.*

Mr. W. Fraser, Agent at Dehli, considered, that he had traced the Gugur into the Sutlej twenty miles above Bawulpore, (Colonel Colvin's report of 1832, on Dehli canals.) Colonel Mackeson, on the contrary, after taking it to the neighbourhood of the

Sutlej, makes it turn and flow parallel to that river. Colonel Mackeson, however, admits the comparative indistinctness of the traces in the Bawulpore territory, and leads it south-westerly into the desert, agreeably to tradition, rather than from his own observation. (See his report of the 15th April, 1844, on the Sirsa and Bawulpore road, *Journal Asiatic Society of Bengal, No.* 148 *of* 1844.)

## APPENDIX C.

### *Old Channels of the Sutlej.*

The narratives of old Mahometan historians and travellers, and the recent surveys of Major Brown, Major Baker, and Lieutenant Hodgson, all lead to the conclusion, that formerly, even more than one branch of the Sutlej, entered the desert from points between the hills and Hureekee, the present junction of the Beeas. If it can be shown that the Sutlej formerly found its solitary way to the ocean, by one or several channels, the "Punjab" or "Pentapotamia," will no longer be embarrassed with the presence of a sixth stream, and the peculiar designation "Satudra," or hundred bellied, will receive a simple explanation.

## APPENDIX D.

### *The Chitung or Hukra in Beekaneer.*

The Chitung, now the Hisar canal, has been traced to enter the Gugur about twenty-two miles below Bhutneer, and doubtless the similarity of its name to the locality given to a valley or flat, may have aided Mr. Fraser, Colonel Mackeson, and others, in tracing the river towards the Sutlej. Chitrang means variegated or adorned, and if the country was formerly as

moist and fertile as is supposed, the present hard and bare levels of the desert, and the banks of the artificially fed Chitung, may have deserved the title. Colonel Mackeson also points out, (*Journal Asiatic Society of Bengal, No.* 148 *of* 1844,) that these Chitrangs are likewise called " Duhurs." This term has now at least locally, the restricted meaning of " rice-lands," but it is doubtless connected with " Dhurtee," a word expressing land generally, and in the present case, it may simply mean, " the flat," and so correspond, in one sense, with Chitrang. In Colonel Mackeson's Report, as given in the *Journal Asiatic Society of Bengal.* " Hukra," is mis-printed, " Slakro," and it may also be here mentioned, that the Suffix " Ban," of Colonel Mackeson, as likewise the adjunct " Buhaun" of Colonel Colvin's maps, mean simply stream or channel from " Beihna," or " Bahna" to flow or move. The term " War," applied to dry water-courses in the Revenue Survey of Bhuteeana, and the word " Buha," applied to cuts from canals on either side of the Jumna, seem to be merely derivations from the same root.

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## APPENDIX E.

### *The Chitung, an artificial river, and the Drishadvutee identified with the Rakshee.*

The present strange topography of the Sursootee and Chitung is explained by the local tradition, that the latter stream is, in fact, an artificial channel, excavated by one of the Dehli Emperors to water the dry country west of the Jumna. The legend is that, Akbar or Feeroz, (either name is used,) having wearied himself when hunting in the tract in question, searched in vain for water to quench his thirst, and was reproached by a Hindoo devotee, with unfitness for dominion, in leaving men and beasts to perish for want of what a paternal ruler would assiduously provide, and which he, a simple hermit, would show, was of easy provision. The Emperor was struck with the rebuke, and un-

der the guidance of the devotee, he collected the waters of the several hill-streams, lying immediately west of the Jumna into a canal which he led towards Hisar. The name of the Ascetic, who is also sometimes said to have been a Bhat, was Cheitun, and hence the Emperor, in his gratitude, called the new work the "Chitung," or according to local pronunciation, "Chowtung," which better agrees with the rules for the formation of collective or descriptive words, and so far strengthens the tradition. This legendary account of the origin of the Chitung is borne out by the following circumstances :—

I.—The river is not recognized by modern Pundits as classical, or as one that has a place in ancient Hindoo writings, although accounts of "Brahmavurt" and "Koorooksheto" are numerous and detailed.

II.—In the decree of the Emperor Akbar, regarding the western Jumna canals, which was obtained at Dhatrut, by Captain S. Abbott, and which is translated in the *Journal Asiatic Society of Bengal*, No. 171, it is distinctly said that, Feerozsha brought water, (i. e. artificially,) from the streams in the vicinity of Sadoura, at the foot of the hills to Hansee and Hisar.

III.—The Revenue Survey now in progress of the Cis-Sutlej States, shows the head of the Chitung to be near Sadoura, and afterwards exhibits the river as crossing the Sursootee, and running between that stream and the Rakshee, until it absorbs the latter previous to being lost in the canal. Now Sadoura is the point at which the feeders of the Markunda could most conveniently be collected and formed into a canal, and, again, the apparent crossing of the Sursootee by the Chitung, serves to show—both, that originally the waters of the former were intercepted by the latter, and that the Chitung was then conducted so as to include the drainage of the Rakshee before being led onwards to Hansee. Thus tradition, Bramanical history, and a genuine Mahomedan

document, as well as the present aspect of the country, all tend to corroborate one another, and to prove that the Chitung is essentially artificial, and that Feeroz Sha's canal was not originally at least fed by the Jumna, although such is said to have been the case by writers of repute, who have composed general histories of India. It is probable, indeed, that subsequent recourse may have been had to the Jumna by Feeroz or his successors, just as Akbar or his son or grandson made use of that unfailing source, although in the decree above-mentioned, it is simply stated that certain small streams had been collected into a canal as had been done by Feeroz.

It may not be thought altogether irrelevant, if I here point out an apparent error in our modern identifications of ancient geographical descriptions. It has been usual to consider the Gugur as representing the "Drishadvutee," one of the boundaries of "Brahmavurt" and of "Koorookshetr." (Elphinstone's History of India, commencement of Book IV, who seems to rest on (query, a mistranslation of) Munoo, and Wilson's Introduction to the Vishnoo Pooran,) but, on what precise grounds the conclusion was arrived at, I do not remember, and have no present means of ascertaining. The Sursootee is another boundary of the two famous tracts mentioned, but from the descriptions in Munoo and the Muhabharut, to which I have been referred by Pundits, and also in other authorities, as quoted by Wilford, (see Sir Henry Elliot's Supplemental Glossary of Indian Terms, Article "Bhuteeana") and it is plain, that the Drishadvutee lay to the east, and the Sursootee to the west of these celebrated regions, whereas the identification of the Gugur with the former would just reverse the positions of the bounding rivers. The Brahmins again, of the Sirhind province, consider, the Rakshee to be the Drishadvutee, and tradition still points it out as the eastern or south-eastern limit of the "field of Kooree," guarded by the four "Jhuks" or semi-demons.

I may also observe, that Drishadvutee means, "the Stony Stream," and Sursootee, or Surusvutee, "the Flowing Stream," and as these names probably denote the ancient characteristics of the rivers, they serve to illustrate the change, which is, intermediately, believed to have taken place in the face of the country and nature of the climate. The Rakshee, instead of showing a pebbly bed, does not even rise in the hills, but has its main source in a rainy-weather swamp, called "Sagur," near Belaspoor, and distant ten or twelve miles from the lowest range of the Himalayas, while the Sursootee, as has been mentioned, now exhibits an occasional instead of a perpetual stream. The dryness of the Sursootee is one argument in favor of a probable decrease of humidity, and the change in the Drishadvutee tends to show, that its sources have been gradually removed from the hills, and also that the talus of the Sewalik range, or the mass of debris at the base of the lowermost Himalayas, is continually increasing. It is not, however probable, that the bed of the well-scoured Jumna, in its present state of equilibrium or comparative sameness, has for a long time been raised as fast as the country on either side. Perhaps, indeed, the washing out of earth and sand may have rendered it lower than at the commencement of the historical period, and as the hill-torrents near it perpetually seek the shortest way to a low level, it is likely, that the Somb may be a new but natural stream, formed by cutting off the heads of the Sursootee and Drishadvutee. This view is almost confirmed by the following circumstances :—

I.—The Revenue Survey maps represent the Sursootee and the Somb to have a common source, and Major Brown, was of opinion, that the waters of the Somb might still be thrown into the Sursootee, so as to add to the safety of the works at the head of the canal. This opinion, however, is disputed by the Engineer Officers of the canal, who further seem to regard Major Brown's delineations as topographically inaccurate,

(Major Baker's Memoranda on the Jumna canals, London 1849, p. p. 10 and 11.)

II.—Nevertheless, the water-course which Major Brown regards as a source of the Sursootee, and Major Baker as a source of the Somb, continues to be distinguished by traditions of the Sage Vyâsa, meditating among Ber, (or Budree,) trees, and by temples and tanks, called, Ad-Budree and Ad-Keedar, the premitive Budreenath and Keedârnâth, thus reducing the springs of the Ganges to a secondary position, and perhaps proving indirectly the less ancient eminence of that river, or that its sanctity only rose as the emigrating Bramins, descended its valley, and became acquainted with its long and fertilizing course. If the Somb should be held to be a new river, formed in the manner supposed, the progress of desiccation of the country generally, will not be so great, as might otherwise be inferred from the changes in the Sursootee and Drishadvutee; while under the explanation given in the preceeding paragraph, it will be obvious, that the western branch of the Dehli canal occupies the bed of the ancient Drishadvutee under its new name of the Chitung, although, probably, the original title is still recognizable in the " Hukra" of the wastes, as it is thought to be in the " Rakshee" of the districts nearer the hills.

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## APPENDIX F.

### *Abstract of the proposed division of the dry-season stream of the Gugur.*

#### I. MUNEEMAJRA.

*1st.*—Two-thirds of the surface stream, at the junction of the Koosuleea with the Gugur, to be the property of Muneemajra.

*2nd.*—Of this share of two-thirds, one-eighth may be withdrawn from the Koosuleea for the irrigation of lands lying above the junction.

*3rd.*—The remainder of the two-thirds to be carried down the Gugur, as much as possible, under the right bank, until it may be convenient to draw it off in portions into the openings of the several cuts.

*4th.*—One-half of the actual channel of the Gugur, with all the springs arising within the same, to belong to Muneemajra, but no cultivation is to take place within the half area so allotted, although cattle may be grazed, and grass and jungle-wood cut. In one-half of the Koosuleea, the same rights as in the Gugur, excepting that no use is to be made of the springs.

*5th.*—Any drift-wood actually stranded, and any transported limestone, &c. actually lodged within the half channel of the river, to be the sole property of Muneemajra.

*6th.*—Corn-mills may be erected at the *discretion of the* Chief, but if in the river-bed only, between the actual course of the assigned share of water and the right bank.

## II. RAMGUR.

*1st.*—One-sixteenth of the actual stream to be drawn off by as many as three cuts.

*2nd.*—Water to drive fourteen corn-mills in all, any deficiency in power of the irrigation cuts being made up by separate cuts close to the bank, so that all such water may be returned without wastage into the river. If the whole of the alluvial soil below Ramgur is swept away at any time, the right to water to drive ten corn-mills to be retained.

*3rd.*—An equal division of the river-bed with the Chief of Chichrowlee, drift-wood, &c., following the proprietorship of channel.

## III. Mobarikpoor.

*1st.*—One-sixteenth of the stream for the lands of Mobarikpoor proper, and one-sixteenth for those of Bunkeepoor, or one-eighth in all.

*2nd.*—Mobarikpoor proper to have the separate right to water sufficient to drive two corn-mills.

*3rd.*—The entire channel of the river to belong to Mobarikpoor, where both banks are possessed ; where one bank, half of the channel, drift-wood, &c., to follow the proprietorship of bed.

## IV. Chichrowlee

*1st.*—One-half of the actual stream below the Muneemajra boundary. Of this share one-fourth, (one-eighth of the whole,) may be withdrawn for the Senowlee villages by means of one cut, and three-fourths, (three-eighths of the whole,) for the irrigation of the villages on the left bank near Busee and below Mobarikpoor, by means of two cuts.

*2nd.*—The right of the village Bertana, to irrigation from a Muneemajra cut disallowed, so far as concerns a guarantee, and former orders are hereby cancelled. The parties at liberty to make their own arrangements for periods of one year at a time.

*3rd.*—The right of the village Kukrala, to water sufficient for one Corn-mill, allowed, but the right to water to irrigate the patch of alluvial land on the left bank under the village not allowed.

*4th.*—Any water which Puteeala may allow to escape from the "Raj-Kool" dam, or which may spring up in the river-bed below the dam, to be the property of Chichrowlee, up to the quantity of one-half, for the irrigation of the villages held by the Chief in the Bunoor district, so far as he can use the water without forming a cut through the Puteeala lands. Any claim to have the said villages irrigated from the "Raj-Kool" of Puteeala not admitted, but the parties are at liberty to make their own arrangements for periods not exceeding one year.

*5th.*—The right to property in the river-bed to follow possession of the banks, the whole, where both banks are held, the half, where one only is held. Drift-wood, &c., to follow proprietorship of area.

## V. PUTEEALA.

*1st.*—The free use of the Gugur and Koosuleea above their junction, for the irrigation of villages at or above that point.

*2nd.*—The third share of the joint stream at the *junction*, to be conveyed down the Gugur, as nearly as possible under the left bank.

*3rd.*—As much water as may be necessary for the irrigation of the villages on the left bank, between the junction and the Ramgur boundary, may be taken from the said third share.

*4th.*—From the junction to the Ramgur boundary cornmills, may be erected at discretion, but if in the river-bed only between the actual course of the one-third share, and the left bank.

*5th.*—Within the same limits or opposite to the Muneemajra district, the left half of the channel to be the sole property of Puteeala, but no cultivation is to be allowed, although jungle-

wood and grass may be cut, and cattle may be grazed within the area.

6*th.*—Drift-wood, &c. stranded and transported limestone lodged within the limits of the said half area of the bed, to be the sole property of Puteeala.

7*th.*—The whole of the stream remaining after the claims of Ramgur, Mobarikpoor, and Chichrowlee have been met, to be the property of Puteeala, but any water which may escape or which may arise in the river-bed below, the "Raj-Kool" dam, to be shared with Chichrowlee up to the quantity of one-half for the irrigation of the Chichrowlee villages in the Chut-Bunoor district, so far as they can be irrigated without cutting through the Puteeala villages.

8*th.*—Any stream remaining or arising lower down than Busee and Chut-Buaoor, to be the sole property of Puteeala, excepting that the Umbala villages are to be allowed to water their cattle at the river by means of pools or dams, so long as water is *obtainable* by excavating or embanking.

9*th.*—The right to the half or the whole of the river-bed, dividing the Busee and Chut-Bunoor districts, to follow possession of one or of both banks, and the right to Drift-wood, &c., to follow possession of the channel or portion of the channel where *it* may be stranded.

(Signed) J D. CUNNINGHAM,
*Captain Engineers.*

(True copy.)

(Signed) H. M. ELLIOT,
*Secretary to the Govt. of India.*
*With the Gov. General.*